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ARTICLE XI OF THE GATT, SUPPLY MANAGEMENT, AND TARIFFICATION: ISSUES FACING THE CANADIAN EGG AND POULTRY INDUSTRIES IN THE URUGUAY ROUND

BY
WENDY CAROLINE CYMBAL

A THESIS
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND
RESEARCH IN PARTIAL FULFILMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTERS OF SCIENCE

IN

AGRICULTURAL ECONOMICS

DEPARTMENT OF RURAL ECONOMY

EDMONTON, ALBERTA

FALL 1991

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ARTICLE XI OF THE GATT, SUPPLY MANAGEMENT, AND TARIFFICATION: ISSUES FACING THE CANADIAN EGG AND POULTRY INDUSTRIES IN THE URUGUAY ROUND

SUBMITTED BY *WENDY CAROLINE CYMBAL*

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF *MASTERS OF SCIENCE IN AGRICULTURAL ECONOMICS.*

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To my mom who showed me dedication,
my dad who inspired me,
and my beloved compañero, Juan Danilo,
who taught me courage.

ABSTRACT

This thesis study addresses the problem of agricultural trade reform in the Uruguay Round related to Article XI of the General Agreement on Tariffs and Trade. Three main areas are examined. First, the origins and evolution of Article XI of the GATT are documented. Issues arising from the interpretation of the Article are identified. Second, the application of Article XI is determined and assessed by examining the development of Canadian agricultural policies leading to the establishment of supply management schemes for poultry products. Third, the tariffication of nontariff barriers is examined as an approach to changing Article XI. Alternate tariff equivalent measures of Article XI-based import quotas for selected Canadian poultry products examining issues of market level, variability, and import-preserving access are assessed. Should the tariffication procedure be adopted as an approach to agricultural trade reform, the study recommends that the current three year average tariff equivalent estimate be based on the price spread between large, location-specific wholesale markets in close proximity in Canada and the United States.

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I. INTRODUCTION

One of the major concerns in international commercial relations today relates to the trade of agricultural commodities. From the inception of the General Agreement on Tariffs and Trade (GATT), regulations governing international trade have been predisposed to exempt or exclude farm products. The consequences of over forty years of special treatment for agriculture from the rules and disciplines of the *General Agreement* are telling. Liberalization of trade in agricultural products has not been substantial. Subsidy wars over export markets have increased the risk and uncertainty in the production of some major farm commodities. Consequently, world markets for farm products exhibit lower and less stable prices while trade patterns tend to reflect the distortions of government intervention rather than market responsiveness to comparative advantage. Recognizing these concerns at the Midterm negotiations of the Uruguay Round in Geneva on April 8th, 1989, Contracting Parties to GATT agreed, *inter alia,* to address how to strengthen and make more operationally effective the rules and disciplines of the *General Agreement* (GATT 1989c).

One of the most evident areas of difficulty in agricultural trade of particular interest to Canada is the special exemption granted to agricultural products in Article XI of the *General Agreement*. Despite the objective of Article XI to eliminate the use of quantitative restrictions in world trade, the Article, in its present form, permits the use of quantitative restrictions for agricultural and fisheries products in compliance with certain conditions. Working within the conditions of Article XI in the 1970s, Canadian policymakers formulated a national agricultural policy covering the production and marketing of eggs and poultry. Through the Farm Products Marketing Agencies Act (1972), the federal government authorized the formation of national commodity-based agencies which could regulate poultry and egg production and marketing throughout Canada with the use of supply management. Changes to Article XI stemming from a newly negotiated GATT agreement could have major implications for Canada's supply-managed agricultural industries.

One of the proposals considered by the GATT's Negotiating Committee on Agriculture proposed to convert all nontariff agricultural trade barriers to tariffs. In other words, an equivalent tariff expressed as either a specific or *ad valorem* rate would replace the nontariff barrier affecting the agricultural product. This is commonly referred to as "tariffication". The second phase of this process would gradually reduce or eliminate the tariff protection over a given period of time. The major focus of this study is to examine the first phase of the tariffication process affecting nontariff barriers, namely import quotas, which protect the Canadian egg and poultry industries.

A. Objectives

The objectives of this study are threefold. The first is to document the origins and evolution of Article XI. The history of Article XI provides the background necessary to understand the perplexities surrounding the Article. It also puts the outcome of Uruguay Round of negotiations into perspective. A second objective is to determine and assess the application of Article XI to the Canadian egg and poultry industries. This is pursued by examining the development of Canadian agricultural policies leading to the establishment of supply management schemes for poultry products. The third purpose of this study is to examine the tariffication of nontariff barriers of the Canadian egg and poultry industries currently permitted by Article XI of the General Agreement. Alternate procedures of calculating tariff equivalent measures of Article XI-based import quotas for selected Canadian poultry products are assessed. Several research questions arise from examining the tariffication procedure and estimates. These questions, along with the corresponding hypotheses, are presented in the section to follow.

B. Hypotheses

In this thesis study, hypotheses relating to the choice of market level and to the variability of the tariff equivalent estimates are tested. All of the hypotheses are tested individually for eggs, chicken broilers, and turkey broilers.

The first research question to be addressed deals with the choice of market level. Typically, wholesale prices are used in the tariffication procedure, although there may be some merit to using farmgate prices. To explore this, several wholesale versus farmgate level issues are discussed. Tariff equivalent estimates to nontariff barriers (NTBs) based on farmgate prices are calculated and compared. The research question presented is: *Are the NTB tariff equivalent estimates calculated at* *the wholesale level significantly different from the estimates calculated at the farmgate level?* This question leads to the first null hypothesis of the thesis study which is stated as:

(1) The mean (1980-1989) of the annual differences between the NTB tariff equivalent estimates calculated using wholesale prices and the NTB tariff equivalent estimates calculated using farmgate prices is equivalent to zero.

The second area in which hypotheses are tested pertains to the issue of the variability of the tariff equivalent estimates. This is addressed by examining potential sources of variability. In particular, the following research questions are asked and hypotheses are tested. Relating to the issue of foreign price instability transmission: *Is the US wholesale price more variable over the 1980s than the Canadian wholesale price series?* The null hypothesis is stated as:

(2) The variance of the US price series (1980-1989) is equivalent to the variance of the respective annual percentage changes in the Canadian price series (1980-1989).

Relating to the issue of potential exchange rate instability: *Can variability in the wholesale NTB tariff equivalent estimates be attributed to the Canadian/US exchange rate?* First the means and the variances of the NTB tariff equivalent estimates are calculated using a constant exchange rate. Then these estimates are compared to the means and variances of the wholesale-based NTB tariff equivalent estimates calculated using the annual exchange rate. The null hypotheses for these tests are stated as:

(3) The mean (1980-1989) NTB tariff equivalent estimate based on wholesale prices calculated using a constant average exchange rate (1980-1989 average)

is equivalent to the mean (1980-1989) NTB tariff equivalent estimate calculated using the appropriate corresponding annual exchange rate value.

(4) The variance (1980-1989) of the NTB constant exchange rate tariff equivalent estimate is equivalent to the variance (1980-1989) of the NTB tariff equivalent estimate calculated using annual exchange rate values.

Relating to the variability of the tariff equivalent estimates over time: *What length of time should the tariff equivalent measure represent?* To explore this question, the means of the current three year (1987-1989) and four year (1986-1989) estimates are compared separately to the means of the ten year period (1980-1989) under study using the following two hypotheses:

(5) The three year (1987-1989) average NTB tariff equivalent estimate is equivalent to the 1980-1989 average NTB tariff equivalent estimate.

(6) The four year (1986-1989) average NTB tariff equivalent estimate is equivalent to the 1980-1989 average NTB tariff equivalent estimate.

C. Nature of the Analysis

To test these hypotheses, tariff equivalent estimates are calculated at the wholesale and farmgate market levels for shell eggs, chicken broilers, and turkey broilers based on the difference between Canadian prices and US prices adjusted for the exchange rate, transportation costs, and the appropriate tariff over a ten year period, from 1980 to 1989, varying in length depending on the test. To explore alternate tariffication procedures, import-preserving tariff equivalents are calculated, utilizing the partial-equilibrium linear demand and supply model described by Moschini and Meilke (1991). Three distinct set of assumptions are made corresponding to the price elasticity of demand, the price elasticity of supply, and the departure from marginal-cost pricing. The major data sources for prices are Agriculture Canada and the United States Department of Agriculture (USDA). A more detailed description of the data is provided in Chapter IV of this thesis study.

D. Scope of the Study

This study examines the Canadian egg and poultry industries from the standpoint of prices at the wholesale and farmgate market levels for shell eggs, chicken and turkey broilers relative to the prices of comparable products from the United States. It does not attempt to quantify the level of support indirectly achieved by poultry producers through supply-management powers and import quotas, although previous estimates of subsidy equivalents are provided in Chapter III. Additionally, this study does not examine the social or political implications of implementing the tariffication proposal.

E. Presentation of the Study

In Chapter II, the origins and evolution of Article XI are traced from the pre-GATT era to the Uruguay Round. Panel rulings affecting the interpretation of Article XI and other difficulties with the Article are also examined. In Chapter III, implications of Article XI for Canadian agriculture are explored. In the case of Canadian poultry products, this includes the use of supply management and import quotas to regulate production and marketing. In Chapter IV, tariffication as an approach to agricultural policy reform affecting the Canadian egg and poultry industries is examined. Lastly, Chapter V provides conclusions and recommendations and addresses areas for further research. The text of Article XI can be found in Appendix A, data tables in Appendix B, and test results in Appendix C.

II. ORIGINS OF ARTICLE XI

A. The Pre-GATT Era

At the turn of the century most countries protected agriculture in order to preserve rural life and to attain self-sufficiency in food production. They used tariffs as the primary instrument of protection for both agriculture and industry. For the most part, it appeared that countries were disinterested in reducing trade barriers. Great Britain, which had embraced free trade with the repeal of the Corn Laws in 1846, was perhaps the exception. France and Germany both adopted protectionist agricultural policies after brief experiences with free trade. The United States maintained protectionist policies for industry and agriculture alike dating back to the eighteenth century. In the nineteenth century tariff rates increased in the United States and in Canada as well. In addition to an international trading regime based on tariffs, special bilateral trade arrangements granting preferential treatment between countries, especially between imperial powers and their respective colonies or dependencies, largely prevailed. The era of multilateral trade agreements had not yet arrived (Nagle 1976, 1-5).[1]

Despite high tariffs and agricultural protection, world agricultural production and trade expanded at a tremendous rate in the latter half of the nineteenth century and in the early 1900s. Europe's rapidly developing economies stimulated imports of food and raw materials. Prior to World War I, Europe was a dominant producer of agricultural products and also one of the biggest net importers of both temperate and tropical products.

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[1] This chapter draws heavily on *The United States and Restoration of World Trade: An Analysis and Appraisal of the ITO and the General Agreement on Tariffs and Trade* (Brown 1950) and *A Charter for World Trade* (Wilcox 1949).

1. World War I

The upheaval of World War I soon altered the patterns of world agricultural production and trade. European agriculture was severely disrupted. Areas not afflicted by war, however, particularly South America, Oceania, North America, and Africa, substantially increased crop production. Although most countries exercised protectionist practices through the use of tariff barriers and bilateral treaties, special treatment for agriculture was not a rule. In the United States, for instance, wartime price guarantees to US farmers during World War I were not "inaugurating a new policy of special treatment for agriculture, but carrying out a definite and binding wartime commitment" (Brown 1950, 36-37). One historian suggests that the existing trading system based on tariffs, in part facilitated the changes in world agriculture at this time. Domestic agricultural programs in Europe and North America had not yet developed into the elaborate and comprehensive import restricting systems that were to follow in the 1930s (Nagle 1976, 5). For nearly the entire decade following World War I, however, world agricultural prices fell drastically. Unlike the industrial sectors of most countries, agriculture did not benefit from the post-war economic recovery.

In addition, to plummeting prices, tariff instability marked the 1920s. In 1921 in the United States, for example, the US government levied emergency duties on agricultural imports. Within a year the US Congress passed the Fordney-MacCumber Tariff, further increasing tariff rates (Brown 1950, 36). Many countries' trading objectives began to emphasize the need to search out new export markets and at the same time, to protect domestic markets from imports. European nations eager to rebuild dislocated productive facilities may have contributed to the turn to more inward-oriented policies, but in general, growing nationalism and a spreading belief in protection for prosperity greatly influenced the global trade perspective.

2. The First Effort

The shock of World War I on the economies of Europe followed by the protectionist turn inward instigated a concerted effort to re-establish former international commercial relations. These attempts, which culminated in a series of conferences under the auspices of the League of Nations held in 1920, 1922, and 1927, became known as the First Effort. Mainly European nations attended the initial conferences, as the United States and the Soviet Union did not hold membership in the League. For the first time countries addressed the reconstruction of the world economy in a *multilateral* context during the World Economic Conferences held in May and October of 1927. Tariff discussions dominated the May Conference. Not surprisingly, agriculture was also a prominent item on the agenda.

At the close of the Conference, however, participating countries managed to declare only the following with respect to agricultural protection:[2]

> It is desirable that all hindrances to the free circulation of and trade in agricultural products should be removed, in so far as their removal does not endanger the vital interests of the different countries and their workers (League of Nations 1927, 45).

After World War I, Britain was unable to regain its position in the world economy. Britain's increased wartime purchases of imports and reduced exports amassed a sizable sterling debt owing to the Commonwealth Dominions. In contrast, the US economy was not afflicted by the war. Richly endowed with natural resources and capital-abundant, the United States emerged not only as the most powerful nation, but also as the most important international creditor. Nevertheless, increased instability and economic crisis at the beginning of the 1920s put pressure on US policymakers to focus inward on domestic concerns.

3. The Great Depression

The onset of the Great Depression of the 1930s crushed any prospects of reducing agricultural protectionism. International agricultural prices continued to fall and trade stagnated. Countries protected both agriculture and industry to an even greater extent (Nagle, 1976, 7). Without any international guidance or commitments, countries began introducing various measures to cope with their domestic problems. In the case of agriculture, most countries introduced some form of quantitative import restrictions in order to maintain high domestic support prices. In retrospect, it may have been unrealistic to expect much progress with respect to trade liberalization in the 1930s, a period of international anarchy, as characterized by the League of Nations, fraught with regionalism, discrimination, bilateralism, and instability (Brown 1950,44).

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[2] This does not preclude success in reducing and stabilizing tariffs in general after the Conference. Sir Arthur Salter recounts, "At the end of the year [1927] the situation, instead of being, as without the Conference it would certainly have been, very much worse, was definitely better" (Salter 1932, 200).

4. The Second Effort

The League of Nations organized another attempt to liberalize world trade culminating in a series of Commercial Conventions of mostly European nations which took place during the winter of 1929-1930. These conferences were held with the view to obtaining a tariff truce, reducing tariff rates, and agreeing to a more organized and rational mode of production and distribution of products. By the end of 1930, however, special problems of negotiating agricultural reform had successfully obstructed any substantial advancements that had been agreed upon earlier (Brown 1950, 39; Salter 1932, 203-204).

Soon after the Commercial Conventions, Britain abandoned its policy of free trade. By October of 1932 Commonwealth nations concluded the Ottawa Agreements, twelve treaties which expanded an elaborate system of reciprocal trade agreements increasing protection and discrimination outside of the Commonwealth while establishing lower preferential tariff rates among members of the Commonwealth (Crane 1980, 249). In particular, the Dominions received preference to the British market for their agricultural products and raw material exports. The United Kingdom granted these preferences in return for an agreement to keep tariff rates low for British manufactures (Brown 1950, 42). Agricultural protection intensified further in Germany, France, and Italy (*ibid.*, 38).

Inward-oriented trade policies were also becoming more prevalent in the United States. In June of 1930 the United States raised tariff rates to unprecedented levels on close to 900 items through the implementation of the Smoot-Hawley Act. The passage set off a global wave of tariffs which was followed by countries directly invoking quantitative restrictions on imports. Product diversion became a major feature of US agricultural legislation during the 1930s (*ibid.*, 25). Inter-war agricultural legislation embodied in the US Agricultural Adjustments Act (AAA) introduced special measures to restrict imports and subsidize exports. The 1933 Agricultural Adjustment Act initiated the first major US agricultural price support and acreage reduction program. Producers regulated certain basic agricultural commodity markets through voluntary agreements with processors and other participants in the food system. Taxes on processors offset the costs of the program. In 1935, the US Congress amended Section 22 of the AAA. This amendment turned out to have great significance in determining the outcome of Article XI in the *General Agreement.* It

> . . . granted the President authority to limit imports whenever any commodity was being imported in sufficient volume to interfere with the operation of any agricultural adjustment program. The only limitation imposed was that imports from any one country could not be reduced to less than 50 per cent of the annual average imports from that country for the period 1928-33 (*ibid.*, 25).

Further amendments ". . . conferred administrative authority on the Executive to use subsidies and dumping, import quotas, import fees, and compensating import and processing taxes as forms of agricultural protection" (*ibid.*).

5. World War II

During World War II there remained an overhanging fear from the inter-war period of world surplus production coupled with declining agricultural prices. Even so, agricultural production in Canada and the United States increased by sixteen percent from pre-war levels of production. Thus, overall net *per caput* world agricultural production declined. Like World War I, the Second World War impeded agricultural production and disrupted distribution and trade (League of Nations 1946, 72-73). Throughout the war European nations rationed food. With the exception of a few developing countries considered to be self-sufficient in food production (albeit at a subsistence level), most countries were net importers of food before the two world wars. After the onset of the war, however, many of these nations were unable to increase their imports and as a result, experienced food shortages. In the severest cases, such as India and China, widespread famines occurred (*ibid.*, 69-70).

Near the end of the war Canada and the United States also rationed food in order to curb the growing demand. The needs of the armed forces, the requirements of the lend-lease agreements between the United States and Great Britain, and prospering conditions in North America, namely rising employment, higher wages, and growing exports, increased the demand for food at a relatively rapid rate (*ibid.*, 64). In spite of food rationing, acute starvation and famine in parts of Europe and the Far East could not be averted. In 1946 in a report entitled *Food, Famine, and Relief*, the League of Nations attributed the plight to more than simply the war. "The intensity of the present crisis is due in part to adverse natural forces such as droughts, and to the upheavals of the closing phases of battle, but fundamentally it reflects the dangerous unbalance that has developed in the world's agriculture" (*ibid.*, 5-6). This imbalance persisted, however, as governments of several countries, including Canada, Great Britain, and the United States, made further commitments to their rural constituents for post-war agricultural price and income supports (Brown 1950, 53). With the absence of an international agreement on agriculture after World War II, some countries decidedly undertook ambitious support schemes of their own.

Not even the League of Nations was prepared to condemn the protectionist measures taken by countries. A League of Nations document examining the economic instability of the 1930s reported that

> In the situation of mass unemployment and mass poverty which developed in the Great Depression, it would have been morally impossible for the governments of the world to have stood idly by and to have waited for "natural economic forces" to cure the situation . . . In the event, each government took separate steps to alleviate distress and to revive agriculture and industry within its own frontiers . . . (League of Nations 1945, 17-18).

The report pointed out, however, that "in the international field the policies adopted . . . like the depression itself, inevitably contributed to the fractionalization of the world economic system and were of a type which aggravated the economic difficulties of other countries" (*ibid.*).

Given the lack of adequate international reserves, many small nations imposed restrictive controls on imports. Large nations also increased import restrictions by raising tariffs, fixing import quotas, and devaluing their currencies despite the criticisms and condemnations of other nations. The critics felt that the economically more powerful nations had a special responsibility to maintain economic activity which the size of their markets imposed on them (*ibid.*, 19).

6. The Third Effort

Despite the turn to inward-oriented commercial policies in the United States, a growing commitment to a more liberal international economic order was becoming prominent among US state officials. The American Administration was determined to lower trade barriers, eliminate discrimination, and establish currency convertibility (Krasner 1977, 656). Perhaps the first sign of a division in US commercial policy was the passage of the Reciprocal Trade Agreements Act of 1934. This Act removed the responsibility of handling trade concerns from the US Congress and delegated it to the executive branch associated with the Reciprocal Trade Agreements Act. In other words, "Congress legislated itself out of the making of trade policy" (Culbert 1987, 383). The commitment to a more liberal trading regime encompassing a new vision of global order has been attributed, in part, to the convictions and the intense lobbying efforts of Cordell Hull, Secretary of State in the Roosevelt Administration from 1933 to 1944. Secretary Hull believed that lower trade barriers would bring prosperity accompanied by peace and stability.[3]

Thus, initiatives of the Roosevelt Administration spearheaded the third effort to reconstruct a liberal world trading system. In the United States, policymakers commenced the drafting of post-war planning and reconstruction even before the end of World War II. The Atlantic Charter, agreed to and signed by the United States and Great Britain in August of 1941, was a first promising step toward multilateralism. The Charter declared the intention of these two governments to ". . . endeavor, with due respect for their existing obligations, to further the enjoyment by all states, great or small, victor or vanquished, of access, on equal terms to the trade and to the raw materials of the world which are needed for their economic prosperity" (Wilcox 1949, 37).

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[3] Other factors that have been suggested as the source of the American desire to construct a liberal international order are the historical American experience identifying economic nationalism with the threat to both peace and prosperity; the United States' new found hegemonic power in the global economic structure; definable American interests anticipating to benefit from a laissez-faire system; and an predominant ideology which foresaw a new world economic order (Krasner 1977, 638-639).

Although, to the dismay of Secretary Hull, the aforementioned "existing obligations" clause of the Atlantic Charter appeared to shield the Imperial Preference system, the general interpretation it was later given was to permit "a short-run exception to avoid violation of the temporary preferential agreements then in force" (Gardner 1969, 52).

Anglo-American talks continued during the 1940s. In February of 1942 following the Atlantic Charter, Great Britain and the United States signed the Mutual Aid Agreement. This agreement primarily set forth the terms of the Lend-Lease arrangements, providing American aid to Britain in exchange for "British cooperation in the post-war reconstruction of multilateral trade" (Culbert 1987, 386). Article Seven of the Agreement calling for " . . . the elimination of all forms of discriminatory treatment in international commerce, and to the reduction of tariffs and other trade barriers . . ." was to become the cornerstone of post-war trade policy (*ibid.*, 387).[4]

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[4] Negotiations of Article Seven extended beyond the signing of the Mutual Aid Agreement. See Chapter IV of Gardner (1969).

B. The GATT Era

Before the end of World War II the multilateralist vision of global economic order had begun to take form. With the signing of Article Seven, the world moved closer to common objectives of post-war economic recovery. Throughout the 1940s the principal trading countries among the Untied Nations met to address the problems of currency, finance, and trade. The plan for recovery included the establishment of three distinct sister organizations: the International Monetary Fund (IMF), the International Bank for Reconstruction and Development[5] (IBRD), and the International Trade Organization (ITO). *The Final Act of the United Nations Conference on Trade and Employment*, also known as the *Havana Charter*, laid out the protocol for the International Trade Organization. Although governments agreed on the creation of the IMF and the IBRD, the US Congress did not ratify the *Havana Charter* for the ITO; consequently, it never came into being.

In the meantime, while countries were awaiting the formation of the ITO, twenty-three countries signed a provisional document, the *General Agreement on Tariffs and Trade*, which emerged from the text of the *Havana Charter*. The Contracting Parties to the *General Agreement* eventually formed the body which took the place of the proposed International Trade Organization.

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[5] The International Bank for Reconstruction and Development is also known as the World Bank.

1. The Formation of Article XI

The United States played a major role in the world plan for post-war economic recovery. During the Anglo-American negotiations, the US government drafted a number of proposals to set forth guidelines on international commercial policy and to establish an organization to oversee international trade. These proposals were revised and further developed between 1943 and 1945 with participation from several countries including Great Britain and Canada until the final draft was published by the US government in December of 1945. Copies of this document, known as the *Proposal for the Expansion of World Trade and Employment* (referred to hereafter as the *Proposals*) were sent to every country. "Between October 1945 and December 1946, the governments to Belgium, Greece, Poland, France, Turkey, Czechoslovakia, and the Netherlands endorsed the purposes of the *Proposals* and agreed to avoid action that would prejudice the outcome of the projected negotiations" (Wilcox 1949, 39).

The original text of Article XI in the *General Agreement on Tariffs and Trade* banning quantitative restrictions first appeared in the US *Proposals* with special provisions exempting agriculture (Buchanan and Lutz 1947, 401). Later in the spring of 1946, interdepartmental committees of the US government elaborated the *Proposals* in a document called the *Suggested Charter for an International Trade Organization* (referred to hereafter as the *Suggested Charter*). The *Suggested Charter* was circulated to member countries of the Preparatory Committee appointed by the

United Nations to work out an agenda for the International Conference on Trade and Employment. Provisions to exempt domestic agricultural price support programs that restrict produced or marketed supplies in the US *Proposals* were carried over in the *Suggested Charter* (Wilcox 1949, 85). After prolonged debate between November 1947 and March 1948 at the International Conference on Trade and Employment sponsored by the Economic and Social Council of the United Nations, the final act of the *Havana Charter* accommodated the ban on quantitative restrictions along with provisions to exempt agriculture. The provisions concerning quantitative restrictions and agriculture were written into Article 20 of the *Havana Charter*. Later, with the creation of the GATT, Article 20 of the *Havana Charter* was abridged and appended to the *General Agreement* as Article XI. Paragraph 1 of Article XI closely follows both the *Havana Charter* and the US *Suggested Charter* stating that no prohibitions or restrictions other than duties, taxes, or other charges can be applied to any product. As this was not initially agreeable to several nations at the various negotiations of the International Conference on Trade and Employment, participants agreed to include the special exemptions for agricultural and fisheries products provided for in the *Havana Charter* (Brown 1950, 193-195). With the intention that the agricultural exemption would not be abused, they also agreed to include safeguards (Wilcox 1949, 85).

Thus, the United States played a major role in formulating the text banning quantitative restrictions. It was also fundamental in formulating special treatment for trade in agricultural products. On the one hand, American policymakers were prescribing an outright ban of all quantitative restrictions, while on the other, they were reluctant to violate existing US legislation. Consequently, US negotiators successfully accommodated US farm and food policies by exempting agricultural trade in the *General Agreement* and its preceding documents.

Indeed, the conflict between general foreign trade policy and agricultural policies of the United States weakened its bargaining position in the Geneva negotiations and posed a major handicap to the development of a consistent policy. Even the Director of the Office of International Trade Policy in the US State Department, acknowledged the "beam in their eye". He wrote,

> We are no more willing than any other country to leave production in agriculture to the mercies of the market. The maintenance of farm prices at levels unrelated to those obtaining elsewhere in the world is a settled policy of our government. When supplies are ample, this means that we control production and marketing. When we produce a surplus to sell abroad, we subsidize in order to compete. When we produce less than we consume at home, we restrict imports so that they will not undercut the established price. The wisdom of our agricultural policy is not here in question, but the fact that it is inconsistent with our belief in private enterprise and with our efforts to restore a freer trading system should be clear (Wilcox 1949, 35-36).

The groundwork devoted to commodity agreements in the US *Proposals*, the *Suggested Charter*, and the *Havana Charter* suggest that it was the US negotiators' intention from the start to protect and maintain their domestic agricultural policy (Brown 1950, 25-27: Jackson 1969, 733).

2. Opposition to Article XI

The majority by far of net agricultural exporters in the 1940s were the world's poorest countries, but Canada, Argentina, Australia and New Zealand were also major exporters. Initially, of course, most of these nations, including Canada, opposed the exemption for agriculture in Article 20 of the *Havana Charter* (Jackson 1969, 311-312, 318).

In contrast, Western European countries in dire need of relief from the post-war food crisis, together with several food importing nations, relied on cheap agricultural surpluses that resulted from policies such as the American price-support programs (Curzon 1965, 173). Consequently, these nations remained largely unopposed to the exception put forward for agriculture in Article 20 of the *Havana Charter* and later Article XI of the *General Agreement* (Stone 1984, 158).

Of course, exemptions for agriculture were not the only issue. It appears that the balance of payments justification for quantitative restrictions covered in Article XII of the *General Agreement* was of considerably greater importance and urgency for both the Western European and the food-importing nations than the agricultural exemption. For example, France was concerned that many countries were not on an equal footing because the productive capacity of some nations increased during the war whereas others torn by war required reconstruction and modernization (Jackson 1969, 310-311).

Less-developed countries (LDCs), following the initiative of India, were more concerned with achieving an exemption for industrialization purposes than for agriculture (Wilcox 1949, 45). By 1954 some developing countries, including India and Brazil, expressed dissatisfaction with the developed countries' use of quantitative import restrictions for agricultural and fisheries products, while there was no provision in the *General Agreement* allowing developing countries to use quantitative restrictions for development purposes (Gupta 1967, 15).[6] Since the European nations and the LDCs were absorbed in the dispute over the balance of payments exemption, the only countries free to contest Article XI 2(c) were Canada, Australia, and New Zealand.

3. The US Waiver of Article XI

Notwithstanding US efforts to accommodate the *General Agreement* to its agricultural policies, Section 22 of the US Agricultural Adjustment Act of 1933 appeared to be inconsistent with Article XI. Congress revised and amended Section 22 several times between 1933 and 1950. Essentially, Section 22 called for the Secretary of Agriculture to notify the President if he believed any imports were rendering ineffective or materially interfering with any programs or operations undertaken by the Department of Agriculture. The President would then investigate the allegation and, depending on his findings, could impose import restrictions in the form of fees or quotas as deemed necessary. In 1950 and again in 1951, the US Congress further amended Section 22 with the addition of subsection (f) which gave Section 22 considerably more strength. The 1951 amendment established a precedent for US legislation to overrule international agreements, including the GATT. It stated, "No trade agreement or other international agreement heretofore or hereafter entered into by the United States shall be applied in a manner inconsistent with the requirement of this section" (Hillman 1978, 211). Clearly, Section 22(f) contravened Article XI of the newly formed *General Agreement.*

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[6] Later attempts were made at improving the trade relations between the LDCs and the more developed countries. In 1965 Contracting Parties introduced Part IV into the *General Agreement*. In the 1970s a generalized system of tariff preferences was adopted, largely resulting from the efforts of the United Nations Conference on Trade and Development (UNCTAD) (Ethier, 1983, 231; Blake and Walters 1987, 41).

The United States, therefore, sought to obtain a waiver of its obligations to Article XI. On March 5th, 1955 the Contacting Parties granted the request (GATT 1955). In the view of some, the other Contacting Parties had no choice but to approve the US request: failure to do so would have either damaged the legal principles of the *General Agreement* or risked US withdrawal from the GATT (Jackson 1969, 735). Conditions that apply to this waiver include the prompt review of import restrictions upon the request any Contracting Party which considers its interests to be seriously prejudiced. In the event that the review reveals a change of circumstances, an investigation is to follow as provided for in Section 22 of the AAA. The Contracting Parties are to be notified of any modification, termination, or extension of existing import restrictions. The United States is to remove or relax any restrictions as soon as it is no longer required. Additionally, the Contracting Parties are to review annually the actions taken by the United States pertaining to the waiver (*ibid.*, 35-36).

A study commissioned by the GATT in 1959 to compare farmgate prices internationally found that the United States did not need to pursue its agricultural support programs for economic reasons (GATT 1959). Some consider the 1955 waiver and the variety of other exemptions granted to agriculture merely a reflection of ". . . an earlier influence which has faded with US hegemony in world markets . . ." (Runge, vonWitzke, and Thompson 1989, 109). Others argue that today the waiver is of greater qualitative significance than quantitative (Zietz and Valdés 1988, 12). Nevertheless, as one expert points out,

> The breadth of this waiver, coupled with the fact that the waiver was granted to the contracting party that was at the same time the world's largest trading nation and the most vocal proponent of freer international trade, constituted a grave blow to GATT's prestige (Dam 1970, 260).

It was clear that by the end of the 1950s the problems of integrating agricultural trade into GATT were not simply an aftermath of two world wars, but intrinsically linked to the pursuits of agricultural policymakers in industrial countries, particularly in the United States (Curzon 1965, 176).

C. Inquiries, Negotiations, and Disputes

Unfortunately, the record of adherence to the rules of Article XI is poor. The rules are often simply ignored (Zietz and Valdés 1988, 25). Some authors attribute this to a perceived unfair and inequitable application of the obligations of Article XI. Jackson points out, for example, that "No other major nation was willing to abide by the GATT rules as long as the United States had its privileged position in agriculture" (1969, 718). Soon other coutries requested special exemptions from Article XI too. This included Belgium (December 3, 1955), Luxembourg (December 3, 1956), and Germany (May 30, 1959) (*ibid.*, 549-552). The next sections examine inquiries, negotiations, and disputes related to quantitative restrictions and agriculture to be followed by the criteria set that has evolved in interpreting Article XI.

1. The Haberler Report 1958

In 1958, a panel of experts reporting to the GATT indicated that a number of highly industrialized countries no longer in balance-of-payments difficulties engaged in the improper use of quantitative restrictions in agricultural products (GATT 1958, 123). Following the release of the study known as the Haberler Report, the Contracting Parties assembled to debate the findings of the report in late 1958. According to one writer, each country read the same text differently to its own liking. In dismay, Curzon (1965) reflects,

> Thus every one found a justification for his policies however protectionist or free-trading and however much they contradicted each

> other. It could hardly have been the object of the experts to provide each protagonist with a set of arguments with which to beat the other. This was a disappointing first result (1965, 185).

The Haberler Report concluded that further progress towards trade liberalization ultimately depended ". . . upon the willingness of the industrial and the non-industrial countries to negotiate on a wide range of their economic and financial policies" (GATT 1958, 12).

2. Committee II

Committee II was established following the Haberler Report to look at protection of agriculture in countries willing to undergo scrutiny. It documented its findings for thirty-eight countries, especially with respect to the use of quantitative restrictions. It observed that the widespread use of quantitative restrictions, *inter alia*, "have frustrated benefits which many countries expected to receive as a result of the obligations arising from the *General Agreement*" (GATT 1962, 23).

3. Multilateral Trade Negotiations

The early rounds of multilateral trade negotiations of the GATT primarily focused on tariff reductions of nonagricultural products (Hanrahan, Cate, and Vogt 1984, 13). Agricultural trade issues and nontariff barriers gradually received more attention throughout the Dillon, Kennedy, and Tokyo Ronds of negotiations, and considerably more attention in the Uruguay Round.

The Dillon Round 1960-62

The Contracting Parties agreed to direct the primary aim of the Dillon Round of Negotiations towards tariff reductions and ". . . the exchange of reciprocal and mutually advantageous concessions" (GATT 1960, 115). The scope of the negotiations also provided for the negotiability of, *inter alia,* import restrictions covered by Article XI:2(c). Contracting Parties had the option to choose the measures which they wished to negotiate through the "freedom of action" rule. Although some success was made in reducing tariff barriers, this rule stymied progress in the reduction of quantitative restrictions. One writer observes, "Some industrial countries, including the European Economic Community [EEC], declared before the beginning of the Conference their intention not to enter into negotiations in respect of nontariff measures and no agreement of this kind came out of the Conference" (Gupta 1967, 71-72). Negotiations on trade in several agricultural products between the United States and the newly formed European Economic Community were deferred to future bilateral or multilateral negotiations. Ultimately, the Dillon Round resulted in tariff reductions for mostly industrial products (Hanrahan, Cate, and Vogt 1984, 15).

The Kennedy Round 1964-67

Like the Dillon Round, the Kennedy Round is known for its successes in reducing tariff barriers which were achieved, in part, by setting tariff reduction targets. Unlike the Dillon Round, however, the Ministers agreed that the scope of the trade negotiations was to cover all classes of products, including agricultural and primary products and that the negotiations would encompass not only tariff but also nontariff barriers (GATT 1964, 47). The growing predominance of special treatment for agriculture through the frequent use of quantitative restrictions tended to make tariffs irrelevant in determining international trade flows for agricultural products and thereby heightened the importance of negotiations in this area (Dam 1970, 70). The Trade Negotiations Committee, in opening the trade negotiations of the Kennedy Round, recognized the link between achieving the tariff reduction targets and finding solutions to other problems in the areas of agriculture and nontariff barriers, among others. Nevertheless, the Committee pointed out that it had not been possible to formulate agreed rules to govern and methods to be employed in the trade negotiations on agriculture (GATT 1965, 110).

During the Kennedy Round, the French introduced the concept of a margin of support, usually referred to as the *montant de soutien*. It expressed an equivalent tariff rate of nontariff barriers in the form of a quantifiable measure.[7] A deadlock emerged between the United States and the European Economic Community, however, possibly as a result of a lack of common ground on the philosophy of agricultural trade policy. It could not be agreed as to whether the *montant de soutien* should be a baseline for reducing protection in agriculture or a measure to consolidate existing levels of support (Golt 1974, 25-27). In the end, the trade negotiations in agriculture appeared to achieve "negligible accomplishments" (Jackson 1969, 718).

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[7] Golt reports that the *montant de soutien* is defined as follows: "The margin of support for a given agricultural product is equal to the difference between the price of the product on the international market and the remuneration actually obtained by the national producer" (1974, 26).

The Tokyo Round 1973-79

Agriculture and nontariff barriers to trade took a prominent place on the agenda of the Tokyo Declaration which opened a new round of comprehensive trade negotiations in 1973 (GATT 1974, 7). By the 1970s, the Contracting Parties recognized that agriculture tended consistently to be ignored. In the report, *GATT Activities in 1973*, they pointed out that trade in agricultural products continued to be among one of the most difficult problem areas in international economic relations (*ibid.*, 31). The initial difficulty with determining negotiating procedures together with the uncertain and volatile economic conditions of the 1970s led to minimal gains in the agricultural negotiations of the Tokyo Round. Despite the major focus of the Round on the definition of an international code of conduct, the Contracting Parties did manage to negotiate two multilateral commodity agreements and agreed to further ". . . develop active co-operation in the agricultural sector within an appropriate consultative framework . . ." to be outlined at the earliest possible date (GATT 1979a, 43).

The Uruguay Round 1986-1991

In 1982, the Contracting Parties of the GATT issued a Ministerial Declaration setting out the work program and the priorities of the 1980s. In it they agreed to undertake, *inter alia*, ". . . to bring agriculture more fully into the multilateral trading system by improving the effectiveness of GATT rules, provisions, and disciplines . . . through their common interpretation; to seek to improve terms of access to markets; and to bring export competition under greater discipline" (GATT 1983, 11-12). They established a Committee on Trade in Agriculture to carry out the tasks outlined in the declaration and to make recommendations to the Council and to the Contracting Parties over a two year period (*ibid*., 17).

The 1982 Ministerial Work Program laid the groundwork for launching the Uruguay Round in September of 1986. Its recommendations for agriculture were carried over to the Punta del Este Declaration (GATT 1987a, 21). The Contracting Parties established fourteen negotiating groups to carry out the program of the Punta del Este Declaration, including one for agriculture (GATT 1987, 34). "For the first time in the history of GATT rounds," the Director-General of the GATT later pointed out, "agricultural trade is . . . considered to be at the centre of negotiations and not at the periphery" (GATT 1989f, 8). The marked differences between the United States and the European Economic Community concerning multilateral approaches to the long-term problems of the farm sector and international trade, however, has hampered progress in agricultural trade reform throughout the Uruguay

Round (GATT 1989g, 7). Talks of the Round held in Brussels in December 1990 failed to reach an agreement, primarily due to the standstill on agricultural trade reform (Eisler 1990). In June 1991, the Chairman issued a note to the Negotiating Group on Agriculture to set out options based on the commitments made in the Punta del Este Declaration, the Midterm Review Agreements, and later agreements of February 1991. In the February negotiations, it was agreed that negotiations related to agriculture would be conducted in the following areas: domestic support, market access, export competition, and sanitary and phytosanitary issues (GATT 1991).

4. Panel Rulings

The integrity of the GATT as an effective institution is maintained by the Contracting Parties' observance of and compliance to the rules and disciplines of the *General Agreement.* While the GATT does not have any legal or binding authority to uphold the rules and discipline of the *General Agreement*, this institution does provide for a process of dispute resolution. The first step involves alerting the country of the objectionable trade practices. The offending country, in turn, is to give sympathetic consideration to the issues raised by the parties concerned. If a satisfactory resolution can not be achieved, the country or countries contesting the practice may make a formal complaint to the Contracting Parties. A panel or working party is usually established by the Contracting Parties to investigate the dispute and to follow up with a preliminary report to be presented to all the Contracting Parties. A final decision is then taken by the entire body. With respect to the application of Article XI, the Contracting Parties have established a number of GATT panels to resolve disputes between nations. The text of Article XI is provided in Appendix A for reference purposes.

Canadian Import Quotas on Eggs 1975

In 1975, for example, the United States requested that the Council of Representatives of the GATT establish a working party to determine if Canada's import quotas on eggs were consistent with Article XI. After considering the points at issue raised by the United States, the working party consulted with Canada and concluded that the Canadian supply management scheme for eggs was in conformity with the obligations of Article XI:2(c)(i) (GATT 1977, 91-93).

European Tomato Concentrates Case 1976

Acting on another US complaint, in 1976 a GATT panel convened to investigate the European Economic Community's implementation of a minimum import price system for tomato concentrates and a licensing and deposit system for certain processed fruits and vegetables (GATT 1979, 68-107). The Panel ruled that the EEC's practice was inconsistent with Article XI:2(c) because the measure which operated to restrict the production or marketing of the fresh product was considered ineffective, and therefore, could not qualify as a legitimate governmental measure. Ironically, the EEC's measures were, as the EEC representative pointed out, less illiberal than the obligations of Article XI:2(c). Nevertheless, the minimum import price system implemented was more protective than if no barriers to imports existed, as argued by the United States.

Japanese Restrictions Case 1986

In 1986 the United States requested an investigation into Japan's use of import restrictions on twelve different agricultural products (GATT 1987a, 56-57). These products were: preserved, concentrated, or sweetened milk and cream; processed cheese; dried leguminous vegetables; starch and inulin; groundnuts; prepared or preserved meats of bovine animals; other sugars and syrups not containing added flavouring or colouring; fruit puree and pastas; fruit pulp and pineapple; fruit and vegetable juices; tomato ketchup and sauce; and certain food preparations. In this case, the Panel ruled against Japan. In particular, the Panel found that Japan's use of prohibitions were contrary to Article XI based on the following:

> It found that some import restrictions applied by Japan were not justified under Article XI:2(c)(i) which provides for import restrictions necessary to the enforcement of governmental measures which restrict quantities of the like domestic product or substitute (refer to Appendix A). This is because no measures were taken to restrict domestic production.
>
> The Panel ruled that certain import restrictions were not justified by Article XI:2(c)(i) for three reasons: (1) import restrictions should not exceed levels necessary for the operation of domestic governmental measures; (2) they cannot normally be applied during the off-season when domestic supplies

> are not available; and (3) the domestic production of the fresh product and earlier-stage products processed from the product must also normally be restricted.
>
> Some restricted imports did not qualify as fresh products or as ". . . those processed agricultural and fisheries products that are in the early stages of processing and still perishable which compete directly with the fresh product and, if freely imported, would render ineffective the restrictions on the fresh product" (GATT 1987c, 81).
>
> The Panel also found Japan's import restrictions to be contrary to the last sub-paragraph of Article XI:2(c) which reqiures public notice of the import restriction and that the restriction must not reduce the proportion of imports relative to total domestic production. It found that Japan did not give sufficient ". . . public notice of the total quantity or value of each product permitted to be imported during a specific period" (*ibid.*, 81) and that Japan was unable to show that, for certain import restrictions, import ratios relative to domestic production did not decrease.

Canadian Import Quotas on Ice Cream and Yoghurt 1989

In 1988 the United States requested that a panel be formed to investigate Canada's addition of ice cream and yoghurt to its Import Control List (GATT 1989). The Panel reported that:

> . . . . ice cream and yoghurt do not meet the requirements of Article XI:2(c)(i) for "like products" "in any form" to Canadian raw milk nor would their free importation be likely to render ineffective the Canadian measures on raw milk production (*ibid.*, 30).

Furthermore, "the Panel found further that the restriction of imports of ice cream and yoghurt is not necessary to the enforcement of the Canadian programme for raw milk" (*ibid*). The Panel recommended that "the Contracting Parties request Canada either to terminate these [import] restrictions or to bring them into conformity with its obligations under the *General Agreement*" (*ibid.*).

5. Interpreting Article XI

These rulings have had a considerable impact on the interpretation of Article XI:2(c) by identifying several criteria that must be met in order to conform to the conditions in Article XI (GATT 1989b, 6-7). They are as follows:

(i) the measure on importation must constitute an import restriction (and not a prohibition);

(ii) the import restriction must be on an agricultural or fisheries product;

(iii) the import restriction and the domestic marketing or production restriction must apply to "like" products in any form (or directly substitutable products if there is no substantial production of the like product);

(iv) there must be governmental measures which operate to restrict the quantities of the domestic product permitted to be marketed or produced;

(v) the import restriction must be necessary to the enforcement of the domestic supply restriction;

(vi) the contracting party applying restrictions on importation must give public notice of the total quantity or value of the product permitted to be imported during a specified future period; and

(vii) the restriction applied under (i) must not reduce the proportion of the total imports relative to total domestic production, as compared with the proportion which might reasonably be expected to rule between the two in the absence of restrictions (*ibid*).

Working parties tend to scrutinize these areas when they evaluate the consistency of a country's quantitative restrictions with the requirements of Article XI.

6. Additional Difficulties with Article XI

Dispute resolution, however, has not been a flawless process. The ambiguity of Article XI has created tension. As the criteria list suggests, for example, the meaning of several terms and phrases found in Article XI are unclear. These include "in any form", "perishability", "early stage of processing", "like products", and "proportionality of market access". After more than forty years it is evident that technology has changed the original meaning of these concepts, albeit the intent behind them may still be valid.

The question of what an agricultural or fisheries product *in any form* is, has not been resolved, although the previous panel findings indicate that the product must be perishable and also in an early stage of processing. Conversely, the term "like products" has several different meanings, depending where it is applied. The League of Nations defined a "like product" as "practically identical with another product" (Jackson 1969, 260). "Like product" as used in Article I (the Most Favoured Nation Clause) of the *General Agreement* has been interpreted more broadly to mean those products within a tariff classification. The interpretation of "like product" as it appears in Article VI covering antidumping and countervailing duties has been deemed to mean the *same* product. Similarly, the "like domestic product" usage in

Article XI has been interpreted to be more narrowly defined than Article I. The question of market access is even less clear than other terms previously mentioned. In general, working parties have tended to recommend that the disputing countries work out a compromise between themselves.

In addition to imprecise wording, Article XI is also dated by notable omissions. Variable levies, voluntary export restraints, and minimum import price arrangements are a few contentious policy tools used to restrict imports that are not explicitly covered by the Agreement. Previous rulings suggest, moreover, that these measures are inconsistent with Article XI because domestic marketing and production of the product in question are not, in general, restricted.

It appears that by the 1990s Article XI has outworn its usefulness. Article XI has matured as an ambiguous and deficient part of the *General Agreement*. Few, if any, parties believe that Article XI should be retained as it is. In the tug of war of international trade negotiations, however, a consensus on the treatment of nontariff barriers in agricultural trade has not yet been achieved.

One approach to liberalize agricultural trade related to Article XI is the comprehensive long-term proposal (referred to hereafter as the *US Submission*) submitted to the Contracting Parties of the GATT by the United States. Among the list of objectives it sets out, the *US Submission* proposes to eliminate Article XI:2(c). It also proposes to terminate waivers and other protocols that allow for derogations to existing GATT rules covering import access. Additionally, the *US Submission* calls for converting all nontariff import barriers to bound tariffs and, like existing tariffs, reducing these over time. The proposal to "tariffy" nontariff barriers, namely import quotas, associated with the Canadian supply management programs for eggs and poultry is the major focus of this thesis study. It will be examined in further detail in Chapter IV.

Another approach to reforming agricultural trade related to Article XI is the Canadian proposal. It contrasts significantly from the US approach. It calls for strengthening and clarifying Article XI as well as developing a new set of comprehensive trade rules that apply equally to all countries and eliminating all country-specific exceptions. It states that import restrictions applied under effective supply control ". . . should reflect a reasonable and predictable balance between the interests of the country and sector subject to effective supply control domestically and the interests of the exporters" (GATT 1990, 2). The position has been influenced in large measure by the active lobbying efforts of producer organizations and other interest groups associated with supply-managed commodities, especially milk and poultry products. Indeed, Article XI has played a substantial role in shaping certain aspects of Canadian agricultural policy. The next chapter explores the implications of Article XI for Canadian agriculture.

III. IMPLICATIONS OF ARTICLE XI FOR CANADIAN AGRICULTURE

A. Introduction

Changing Article XI would likely affect most major trading nations to some degree. On the one hand, it could increase market access for export-oriented commodities. On the other hand, it could alter the market structure for import-competing commodities previously sheltered by quantitative import restrictions. In Canada, changing Article XI would directly affect the production and marketing of eggs, poultry, and dairy products. These are commodities regulated by national supply management schemes that were devised to operate within the framework of Article XI. The implications of Article XI for Canadian agriculture are explained in this chapter. To begin, this chapter examines the evolution of regulated marketing in Canada leading to supply management in the egg and poultry industries. The following sections compare producer and consumer subsidy equivalent estimates as a means to assess the impact of government support to the egg and poultry industries. The chapter concludes with a discussion of the trade implications of supply management.

B. The Evolution of Regulated Marketing in Canada

As novel as national supply management seemed in the 1970s, by no means was government intervention in Canadian agriculture new. As in many countries, early Canadian agricultural policy aimed to expand agricultural production and increase productivity.[8] After Confederation in 1867, the federal government began to actively support the fledgling agricultural sector by promoting immigration and settlement, instituting market legislation, establishing agricultural institutions, subsidizing credit, and encouraging scientific research and extension. The importance of Canada's public policy objective to extend the agricultural frontier reflected on other major decisions such as building the Canadian Pacific Railway and granting homesteading entitlements. Indeed, early Canadian agricultural policy fulfilled a larger role as a policy of nation-building. Not unexpectedly, Canadian agriculture became increasingly commercialized. Exports of farm products rapidly expanded. Although Canadian agriculture's access to US markets had been gradually diminishing in the years immediately prior to Confederation, and virtually closed with the enactment of the McKinley high tariff in 1890, Great Britain remained to be a viable and certain export market[9] (Drummond, Anderson, and Kerr 1966, 15-16).

The developmental nature of Canadian agricultural policies successfully increased agricultural production, raised farm income, and in general, increased the well-being of the nation (Crown and Heady 1972, 5). It provided a growing urban population with an abundance of food at relatively low, stable prices. The growing agricultural sector contributed substantially to industrializing the nation. Agriculture's rising labour productivity and low cost products supplied manufacturing and other sectors with needed raw materials. Increased purchasing power in agriculture from rising farm incomes created markets for manufactures and industrial goods. The foreign exchange earnings of agricultural exports enabled the purchasing of imports necessary for an expanding economy (Drummond, Anderson, and Kerr 1966, 70-71).

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[8] This section draws heavily on *A Review of Agricultural Policy in Canada* (Drummond, Anderson, and Kerr 1966).

[9] Reduced access to US markets was due to a combination of factors including the weakening demand for Canadian agricultural products after the end of the US Civil War (1861-1865), the abrogation in 1866 of the Reciprocity Treaty of 1854 between Canada and the United States, and the rapid expansion of agricultural production in the western United States.

Although agriculture was an instrument of nation building, agricultural interests also conflicted with national policies. This became more apparent as domestic demand for agricultural products levelled off (the result of a slower population growth rate and an income elasticity of demand for food that declines as income is increased). For example, Canadian commercial policy employed high tariffs to protect the industrial sector. This disadvantaged the agricultural sector considerably. Farmers generally felt that tariffs on agricultural imports could not effectively support the relatively depressed agricultural prices, while tariffs on other goods, namely farm implements and building materials, increased the costs of major farm purchases. It was no surprise that leading up to the federal election of 1911, some western farmers were calling for free trade with Great Britain and a return to reciprocity with the United States. For the most part at this time, however, the federal government made only minor tariff reductions in reaction to farmers' requests[10] (*ibid.*, 23-26).

By the 1930s the federal government confronted substantial pressure from farmers. Depressed incomes, general unemployment, and a worsening terms of trade for primary products prompted the federal government to appoint a Royal Commission in 1934. The Commission investigated the causes of the widened price spreads between prices received by primary producers and those paid by consumers. While some members of the Commission believed that the virtual collapse of foreign markets was largely responsible for the low incomes of labour and primary producers, the overall conclusion of the Commission was that the widening spreads were the result of increased concentration and diminished competition in the marketing channels for agricultural products (Drummond, Anderson, and Kerr 1966, 34).

Canadian farmers had tried to secure higher prices for their products in the years prior to the Depression by organizing voluntary cooperatives. Despite the important role of cooperative marketing in Canadian agriculture today, voluntary cooperatives were largely unable to address the problem of low prices. The voluntary nature of cooperatives tended to undermine the market power that members hoped to achieve during difficult periods. Without compulsory participation and greater control over marketing and production, farmers found that their ability to raise prices was limited. Initially, a cooperative effort to raise prices might be successful. Where this occurred nonparticipants could take advantage of the higher post-harvest prices, effectively forcing market prices to fall at the expense of the cooperators and eventually encouraging cooperative members to break their contracts and sell independently.

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[10] This does not preclude tariff reductions that were granted in the decades that followed. Today numerous types of farm implements and agricultural inputs are tariff-free and tax exempt.

In 1934 the federal government passed national marketing legislation in response to poor economic conditions, perceived market failure, and pressure from farmers. This legislation, known as the Natural Products Marketing Act, established a Dominion Marketing Board which had wide powers over the sale of products, forming pools, and levying equalization fees on farmers and processors. Twenty-two marketing schemes were approved before the end of 1935 when the Act went before the Supreme Court of Canada. In 1937 the Judicial Committee of the Privy Council of the Dominion government upheld the decision of the Supreme Court which declared the Act *ultra vires.*[11] Although the House of Commons repealed the Natural Products Marketing Act, several provinces, with the support of the Chamber of Agriculture,[12] passed their own laws in order to continue the marketing board legislation (*ibid.*, 36; Poetschke and MacKenzie 1957, 5-6).

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[11] Earlier provincial attempts to legislate market regulation had been made in British Columbia. In 1927 the BC Legislature passed the Produce Marketing Act, legislation requiring all growers to participate in a marketing scheme. This Act empowered a Committee of Direction "...to regulate all aspects of marketing, to set prices, to collect a levy to cover operating costs, and to establish an equalization fund". The effort was thwarted, however, in 1931 when the Supreme Court ruled the Act *ultra vires* on the grounds that the levy constituted an indirect tax and that it interfered with interprovincial trade (Drummond, Anderson, and Kerr 1966, 35).

The 1930s and 1940s marked a new era for Canadian agricultural policy. Its focus extended beyond growth and expansion objectives to encompass support and stabilization initiatives. After World War II, the federal government with the participation of the Canadian Federation of Agriculture, drafted a bill that enabled provincial producer marketing boards ". . . to exercise outside the province the same powers which provincial legislation allowed them to exercise within the province" (Poetschke and MacKenzie 1957, 6). This bill became the Agricultural Products Marketing Act in 1949. The popularity of marketing boards among farmers soon spread from fruit and vegetable growers to other commodity groups including producers of hogs, honey, and wool. Each provincial marketing board determined the extent to which it would regulate the commodity it covered and which market functions it would perform.

Canadian agriculture during the 1950s and 1960s exhibited unusual market instability and persistent excess capacity[13] (Forbes, Hughes, and Warley 1982, 15). This was due largely to a number of factors. Rapid technological change and developments in marketing increased agricultural productivity at a tremendous rate during the 1950s and 1960s. Producers operated in an environment of intense competition. Demand for agricultural products, especially products which could not be exported easily, slackened relative to production. Real output prices tended to fall relative to input prices. These changes resulted in a cost-price squeeze pressuring farm incomes. These pressures obliged governments to increase their commitment to farm price and income stabilization. In response, the federal government introduced the Agricultural Stabilization Act in 1958 (*ibid*).

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[12] The Chamber of Agriculture later become the Canadian Federation of Agriculture.

[13] This section draws heavily on Chapter 6 of *Economic Intervention and Regulation in Canadian Agriculture* (Forbes, Hughes, and Warley 1982).

1. Regulated Marketing in the Canadian Egg and Poultry Industries

Poultry and egg producers were particularly susceptible to the financial stresses of market conditions during the 1950s and the 1960s. In addition to low prices and narrow margins, producers also had to contend with a considerable degree of cyclical and seasonal price variations. Stabilization schemes did not provide any support for broilers. The Agricultural Stabilization Act (1958) provided only limited relief for eggs. A primary source of market instability in the poultry sector in Canada originated from the larger, more advanced broiler and egg industry in the United States.[14] New production and marketing techniques were seen as a threat to Canadian markets by Canadian poultry producers who feared the extensive structural and organizational changes occurring in US poultry markets.

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[14] Among the advances made in the efficiency of poultry production were improved genetics of laying and broiler birds enhancing the rate of lay, muscular growth, and disease resistance; improved feed and feeding programs; automation of all operations; and new methods of housing, breeding and disease prevention (Moncrieff, Weaver, and Fawcett 1978, 13.2).

In response to producer concerns, several provinces established producer marketing boards for broilers and for eggs in order to increase the market power of producers and to reduce the level of horizontal competition that was feared might drive large numbers of the small-scale and less efficient producers out of business. In order to effectively raise prices, some of these marketing boards allocated quotas to producers to restrict the production or marketing of poultry products. To maintain the higher price levels, provinces used restrictive packaging and licensing regulations which curtailed the sale of like or similar products from other provinces. These administrative provincial trade barriers provoked other provinces to retaliate leading to the notorious "chicken and egg price wars" of the early 1970s (Veeman and Veeman 1980, 6-7).

In an effort to "restore market order and preserve the integrity of the common market", the federal government passed the Farm Products Marketing Agencies Act in 1972 (Forbes, Hughes, and Warley 1982, 46). This Act established the National Farm Products Marketing Council and authorized the establishment of national marketing agencies for farm products (Agriculture Canada 1989, 23). This legislation led to the creation of national marketing agencies which administer the production and marketing of poultry products in Canada. The Canadian Egg Marketing Agency became operational in 1973, the Canadian Turkey Marketing Agency in 1974, the Canadian Chicken Marketing Agency in 1979, and the Canadian Broiler Hatching Egg Marketing Agency in 1986. These agencies regulate production and marketing by determining national quota levels. In an effort to provide for public accountability, the National Farm Products Marketing Council monitors the activities of the national agencies. The national quota is divided among provincial marketing boards which hold membership in the national agency. The provincial boards allocate their respective quota share to individual producers. The national agencies also exercise other supply management powers such as price determination or coordination and surplus removal activities. The programs have involved the use of quantitative import restrictions. Protective tariffs have provided additional support for some commodities.

C. Supply Management

Supply management has been controversial since its inception. Advocates argue that supply management operates in the interests of producers by enhancing price stability and assuring producers a fair return for their labour and investment. Unlike other types of price stabilization programs, supply management programs do not rely on direct government funding. Supply management is argued to protect the family farm and to serve as a defence against the decline of rural communities by providing for a greater number of farmers to earn an income on the farm (Winson 1990).

Supply management adversaries argue that it leads to structural inflation of costs and prices, increases inefficiencies in production, and reduces competition in the marketplace. They point out that the costs of supply management are imposed on the consumer and that, in the long run, regulated marketing may not be beneficial to producers because higher production costs have an impact on the future viability and profitability of the industry and as well as on individual producers (Agricultural Economics Research Council of Canada 1979, 3).

1. Producer and Consumer Subsidy Equivalents

One method of assessing the economic impact of government intervention in agriculture is to examine aggregate measures of support. The most commonly used are the producer subsidy equivalents (PSEs) and consumer subsidy equivalents (CSEs). PSEs are commonly defined as the income transfer from domestic consumers and taxpayers to producers as a result of government policies and programs, including the implementation of price supports, import quotas, or tariffs (Cahill and Legg 1990, 15). Similarly, the CSE corresponds to the tax or subsidy implicitly attached to consumption resulting from a set of policies and programs. Like other aggregate measures of support, the main purpose of the subsidy equivalent ". . . is to aggregate, in a manageable way, a wide range of different price and non-price policies whose effects are not otherwise comparable" (Tangermann, Josling, and Pearson 1987, 266). The United States Department of Agriculture (USDA) and the Organization for Economic Cooperation and Development (OECD) have made considerable effort to estimate and assemble subsidy equivalents for a number of countries covering a wide range of commodities. Official Canadian subsidy equivalent estimates have not been published for Canada.

Methodology

In general, the USDA and the OECD use the same methodology to calculate subsidy equivalents. The generalized forms (Cahill and Legg 1990, 17) of the percentage PSE and percentage CSE are expressed as:

$$PercentagePSE = \frac{Q_p(P_d - P_w) + D - L + B}{(Q_p \times P_d) + D - L} \times 100 \qquad \textbf{(III.1)}$$

$$PercentageCSE = \frac{-Q_c(P_d - P_w) + G}{Q_c \times P_d} \times 100 \qquad \textbf{(III.2)}$$

where Q_p	is the quantity of the commodity domestically produced;
Q_c	is the quantity of the commodity domestically consumed;
P_d	is the domestic market price received by producers;
P_w	is the external reference price denoted as the world price;
D	is the sum of direct payments to producers;
L	is the sum of levies on producers;
B	is the sum of all other budgetary outlays for producers;
G	is the sum of subsidies to consumers.

The price gap between internal and external reference prices combined with other policy transfers make subsidy equivalent measures unique in that they not only reflect trade under current market conditions via prices and production levels, but also transfers that escape detection using the price gap method alone.

Subsidy equivalents expressed in percentages are commonly used to compare support levels across countries and across commodities. Percentage PSEs can be greater than 100 because the denominator does not include indirect government transfers such as research and extension services, among others. Strategies to avoid high percentage PSEs could impose limitations to comparisons of support levels over time. For example, a strategy in which support policies are channelled away from the broader types of indirect support (represented in Equation III.1 as *B*) toward direct producer assistance (represented in Equation III.1 as *D*) could increase apparent levels of support concomitant with lowering the actual PSE percentage[15] (Wainio, Chattin, and Sullivan 1988, 107). Of course, the reverse could also apply. Whether unwittingly, or otherwise, a country could simply reallocate its support to producers by redirecting direct transfers (*D*) to other more indirect forms of budgetary outlays (*B*) and thus effectively increase the percentage PSE without actually changing the total value of the PSE.

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[15] This assumes that the dollars of direct assistance provide more support than the same dollars channelled as indirect assistance.

Limitations

While subsidy equivalents appear to be a favoured measure of aggregate support, there are several assumptions and limitations that are to acknowledged. In general, PSEs and CSEs are static snapshot measurements of assistance at a particular point in time. As a result, secondary or dynamic effects occurring from assistance are not taken into account.

PSEs do not indicate the distribution of subsidies within a given commodity nor the distributional effects of those subsidies. Normally, subsidy equivalent estimates do not consider interactions between commodities. The subsidy equivalent methodology also assumes that program benefits are additive and thereby neglects the possibility that combinations of certain programs may be more or less beneficial than the degree to which the measurements suggest (Wainio, Chattin, and Sullivan 1988). Implicitly, PSE measures treat all support equally. In other words, it is assumed that each dollar spent on research and development, for example, is equivalent to each dollar's worth of price support (Goodloe 1988, 37).

Further to this, PSEs do not indicate the effect of government policies on domestic or world prices. The policies of two countries with the same PSEs may have very different effects on agricultural markets. First of all, different policy instruments create different trade effects. Secondly, consumers and producers may respond differently to the same types of government intervention in different countries for several reasons, including the state of technology, resource constraints, social and political factors, and particular market characteristics. The size of a country's trade share also influences the impact of its policies on world markets. Consequently, high PSEs in a small trading nation like Canada for commodities like poultry products seem to be relatively less important than high PSEs in countries or regions which can influence the world prices of these products such as the United States or the European Economic Community.

The homogeneity of commodities is an important factor in making price comparisons. To account for the differences in type or quality of heterogeneous commodities, price adjustments must be made. Exchange rates, stocks, and separability of policies may also be problematic in calculating subsidy equivalents. As is evident from the discussion above, subsidy equivalents are dependent on large amounts of data and knowledge about the commodities, government programs, and policies.

Subsidy Equivalent Estimates for Selected Canadian Poultry Products

Annual percentage producer and consumer subsidy equivalents for selected Canadian poultry products for the period 1979 to 1987, calculated by the OECD and the USDA, are provided in Tables III.1 and III.2. Although the "All" commodity groups of OECD and USDA subsidy equivalents do not include the same combination of commodities, these categories provide relative estimates of the general level of support to Canadian agricultural producers.

Table III.1 PSEs for Selected Canadian Commodities, from Selected Sources, 1979-1987, in Percentages

Commodity	Source[a]	1979	1980	1981	1982	1983	1984	1985	1986	1987
All[b]	OECD	26	25	26	28	28	33	39	49	46
	USDA	n/a	n/a	n/a	23	26	30	39	44	39
Poultry	OECD	23	25	36	35	32	24	22	12	32
	USDA	n/a	19	29	30	25	17	12	1	22
Eggs[c]	OECD	18	28	29	16	17	7	5	3	25

Notes:

a. OECD 1979-86 (OECD 1989); OECD 1987 estimate (OECD 1989a) USDA 1980-81 (Goodloe 1988); USDA 1982-87 (USDA 1990)

b. Commodities included in the "All" category of the OECD PSEs are beef and veal, coarse grains, eggs, milk, oilseeds (other than soybeans), pigmeat, poultrymeat, soybeans, sugar, and wheat.

Commodities included in the "All" category of the USDA PSEs are barley, beef and veal, corn, flaxseed, milk, oats, pork, poultry, rapeseed, rye, soybeans, sugar, and wheat.

c. USDA PSEs for eggs are unavailable.

n/a denotes PSEs which are not available.

Table III.2 CSEs[a] for Selected Canadian Commodities, from Selected Sources, 1979-1987, in Percentages

Commodity	Source[b]	1979	1980	1981	1982	1983	1984	1985	1986	1987
All[c]	OECD	-23	-22	-24	-26	-25	-27	-33	-40	-38
	USDA	n/a	n/a	n/a	-10	-12	-12	-17	-15	-13
Poultry	OECD	-16	-18	-27	-24	-21	-11	-8	2	-16
	USDA	n/a	n/a	n/a	-12	-8	-4	-2	2	-5
Eggs[d]	OECD	-11	-21	-20	-18	-19	-7	-11	-7	-23

Notes:

a. The OECD CSEs are a ratio of total net transfers from consumers to the value of consumption whereas the USDA CSEs are a ratio of total net transfers from consumers to consumers' costs.

b. OECD 1979-86 (OECD 1989); OECD 1987 estimate (OECD 1989a) USDA 1982-87 (USDA 1990)

c. Commodities included in the "All" category of the OECD CSEs are beef and veal, coarse grains, eggs, milk, oilseeds (other than soybeans), poultrymeat, sugar, and wheat.

Commodities included in the "All" category of the USDA PSEs are barley, beef and veal, butter, cheese, corn, milk, oats, pork, poultry, sugar, and wheat.

d. USDA CSEs for eggs are unavailable.

n/a denotes CSEs which are not available.

OECD Subsidy Equivalents

The OECD PSEs for livestock commodities (including poultry meat and eggs and implicitly incuded in the "All" categories of Table III.1) net out the effect of excessive feed costs incurred as a result of Canadian transportation policies. Taxes or subsidies applied to imported animal feeds (namely wheat, coarse grains, soybeans, and skimmed milk powder) are also factored in the calculations. Excess feed costs in 1986 are considered to represent on average ten percent of the total livestock PSEs (OECD 1989a, 9). The external reference prices used in the subsidy equivalent calculations are adjusted for transport costs to derive a landed price in Canada.[16] Producer levies have not been deducted from the PSE estimates. The OECD "Poultry" category represents chicken and turkey meat. The producer price is derived by weighting average prices of chicken and turkey broilers. To estimate the market support component for poultry, the OECD calculated separate price differentials (between domestic and external reference prices) for chicken and turkey and then applied the differentials to the respective levels of production (*ibid.*, 12). The producer price is applied uniformly as the domestic price to value production in the PSE calculations and as the price used to value consumption in the CSE calculations[17] (*ibid.*, 9). In general, the OECD's calculations include all levels of governmental assistance. Federal expenditures for general services are allotted to each commodity by its share in national farm cash receipts. Administrative costs associated with advisory services are excluded and fees paid by producers for inspection services are deducted from the total expenditure value. Similarly, provincial expenditures for general services are allotted on the basis of each commodity's share of provincial farm cash receipts (OECD 1989a, 8). The subsidy equivalents are calculated as close to the producer and consumer stages as possible. Downstream subsidies to processors which do not benefit producers are excluded as are upstream subsidies and taxes applied to agricultural inputs (OECD 1987, 107).

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[16] The specific methodology used to adjust for transport costs is not provided by the OECD.

[17] Previously, the OECD computed the percentage CSE estimates as a ratio of total net transfers from consumers to the value of consumption assessed in terms of retail prices rather than producer prices (OECD 1989a, 9).

USDA Subsidy Equivalents

To calculate the market support component of the subsidy equivalent measures, the USDA derives the external reference price from an observed world price adjusted for agricultural policies and financial market conditions (Wainio, Chattin, and Sullivan 1988, 105). For the domestic price component of the USDA poultry PSEs, the Department weighted average Toronto chicken and turkey broiler prices by slaughter ratios. The Department used average US producer prices weighted by Canadian production for the external reference price component. The CSE external reference price is weighted by Canadian consumption. The consumer price used in the CSE estimate is based on producer prices adjusted by wholesale and retail price spreads using average Toronto chicken and turkey retail prices weighted by consumption. No apparent adjustment has been made for the costs of transportation and distribution.

The USDA PSE calculations include both direct and indirect transfers to producers. Indirect policy transfers comprised in the PSEs for poultry include price intervention (achieved by the use of price supports and import quotas), input assistance (the feed freight subsidy), marketing assistance covering inspection services and promotion, infrastructure support, and provincial programs. Budget data are used and allocated by each commodity's share of cash receipts. No direct deductions are made for producer levies. Health and sanitary regulations, food aid, general economic and taxation policies are excluded from the USDA's calculations (USDA 1988, 24-27). These types of policies are potential candidates for exemption from any agreement through GATT, regarding reduction of agricultural support.[18]

2. Trade Implications of Supply Management

The percentage subsidy equivalents in Tables III.1 and III.2 indicate that producers of poultry and eggs have received substantial income transfers from government intervention and that consumers have borne a substantial share of the costs. Nevertheless, high levels of support provided by supply management have been viewed as a national economic and political problem, but until recently, have not been considered an international trade problem (Meilke and Warley 1989, 17).

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[18] The definition of which policies or criteria constitute the "green" (exempt) category and which constitute the "amber" category (those subject to reduction) has yet to be resolved in the Uruguay Round of Negotiations (GATT 1991).

Proponents of supply management contend that trade distortions resulting from the supply-side of the market are minimized through the use of policy instruments such as production quotas and over-quota penalty levies. They also expect trade distortions occurring on the demand-side of the market to be low given the inelastic relationship between prices and quantities demanded for commodities like eggs, chicken, and turkey (*ibid.*). Furthermore, they maintain that the 1975 GATT ruling on import quotas for eggs established that the supply management regulations affecting trade are in conformity with international obligations.[19] The manager of the Canadian Turkey Marketing Agency appearing before the House of Commons Standing Committee on Agriculture, for instance, argues this point.

> Effective supply management is predicated on import restrictions, not prohibitions, as permitted under Article XI of the General Agreement on Tariffs and Trade. The Canadian government and the Canadian turkey growers have worked together since 1974 to ensure that the disciplines and obligations of Article XI are upheld and the operation of national supply management do not contravene the conditions of that article (Canada. House of Commons 1989, 14:10-14:11).

Opponents of regulated production and marketing argue that supply controls do distort trade because they deny exporters market opportunities in Canada. This occurs since higher domestic prices dampen the demand for the product and import quota restrictions effectively seal off local markets from the world market. Regional and interprovincial trade are also distorted by national supply management programs (Veeman 1988). Furthermore, if surpluses cannot be sold domestically, overproduction is exported to foreign markets below the cost of production or could be destroyed. Dumping, that is, exporting below the cost of production, is a trade irritant to foreign producers who face the increased competition.

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[19] The panel concluded that import restrictions administered by the Federal government of Canada were in accord with Article XI of the *General Agreement*. For more detail see Chapter II.

Despite the federal government's longstanding support of agriculture in Canada, changes in attitudes and in the economic environment, domestically as well as globally, suggest that supply management must be more responsive to the demands of the market place. In March of 1991 the National Poultry Task Force released its final report, *Towards the Development of a Second Generation of Poultry Supply Management Systems* (Canada, National Poultry Task Force 1991). While it fully supports the Canadian government's position to strengthen and clarify Article XI for the long term viability of supply management systems in Canada, it also recommends a review of the current system of import quota allocation to ensure that it is fair, efficient, transparent, and more responsive to market conditions. Tariffication of import quotas discussed in the chapter to follow may be a means to achieve these objectives.

IV. TARIFFICATION AS AN APPROACH TO AGRICULTURAL POLICY REFORM

In July of 1989, the United States submitted a comprehensive proposal to the GATT's Negotiating Committee on Agriculture outlining four major areas of agricultural policy reform: import access, export competition, internal support, and sanitary and phytosanitary measures. Tariffication was proposed by the United States as one component of the approach to reforming policies which restrict market access to agricultural trade (GATT 1989h). As stated in the *US Submission*:

> The objective is to orient domestic production to market forces through conversion of all nontariff barriers to bound tariffs and ultimately reduce all agricultural tariffs to zero or low levels. After an agreed transition period, all import protection would be in the form of tariffs (*ibid.*, 3).

The tariffication proposal is complemented with the termination of all derogations to existing GATT rules including waivers; the prohibition of import barriers not explicitly provided for the GATT; and the elimination of Article XI:2(c) of the *General Agreement*. In order to facilitate an orderly transition into a tariff-based regime and to ensure a degree of minimum access for exporting countries which may be faced with extremely high levels of protective tariff equivalent rates, tariff-rate quotas are proposed. The initial quota could be set at the current level of imports, a level relating to some recent historical period, or negotiated.

The concept of tariffication is not new. During the Kennedy Round of trade negotiations, France proposed the *montant de soutien*, a similar measure intended to quantify the gap between domestic and world prices and to bind the level of protection.[20] Converting quantitative restrictions to bound nondiscriminatory tariffs has been proposed as a means to liberalize trade in textiles and clothing currently regulated by the Multi-fibre Arrangement (Wolf 1985). Veeman (1987) proposed replacement of import quotas by tariffs for Canadian supply-managed agricultural commodities. Recent support of tariffication as an alternative proposal for international trade reform, endorsed for its capability to fully integrate agriculture into the GATT framework, can be found in Zietz (1988). Tariffication of all border measures is considered by Aart de Zeeuw, Chair of the Negotiating Group on Agriculture of the Uruguay Round, to give the best possibility of meeting the objective of more market-oriented trade policies (GATT 1990a).

To begin, this chapter examines the economic theory behind tariffs and their relationship to quotas under conditions of perfect and imperfect competition. Some limitations to tariffication are then identified. The methodology used to convert nontariff barriers (NTBs) to tariffs, followed by the findings of other studies, are presented. Issues related to the use of prices from the wholesale versus farmgate market level, to the variability of tariff equivalent estimates, and to the derivation of import-preserving tariff equivalent estimates are examined in the final sections.

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[20] Granted, France had hoped that the *montant de soutien* would secure this level of protection rather than be used to negotiate its reduction (Golt 1974, 26).

A. The Merits of Tariffication

An important feature of the tariffication approach to agricultural policy reform is that it simplifies the treatment of a wide range of existing trade barriers within the GATT (International Agricultural Trade Research Consortium (IATRC) [1989], 2). The tariffication approach is appealing because of relative computational ease and minimal data requirements. It could easily be applied to all imports competing with identical domestic commodities. Furthermore, it could be broadly applied across various sectors. Like tariffs, tariff equivalents to nontariff barriers would be easy to implement and monitor, as well as relatively easy to negotiate. Tariffication is also favoured because it "recouples" importer markets to world markets (*ibid.*, 18). This has the potential effects of not only enhancing competition in protected markets, but also improving stability in world markets.

1. The Preference for Tariffs

Tariffication is consistent with GATT principles. Unlike most nontariff barriers used in world agricultural trade, tariffs are a legitimate form of trade restriction in accord with the *General Agreement*.[21] In general, the preference for tariffs is based on three principles: nondiscrimination, transparency, and market responsiveness.

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[21] This, however, does not preclude the objective to reduce both tariff and nontariff barriers affecting international trade.

Nondiscrimination

The nondiscriminatory use of tariffs is safeguarded through the Most-Favoured-Nation Treatment provision outlined in Article I of the *General Agreement*. If all foreign imports of a particular commodity, regardless of the place of origin, are subject to the same tariff rate by a Contracting Party of the GATT, the tariff is considered to be nondiscriminatory. The use of tariffs can avoid direct discrimination against a particular commodity, industry, or sector if the same rate is applied across-the-board. Of course, tariffs can be applied in a discriminatory manner.[22] The high visibility of tariffs, however, obliges importing nations to be nondiscriminatory (Dam 1970, 148).

Transparency

The transparency of tariffs allows their trade-distorting effects to be clearly visible to the exporter and their costs known. Tariffs reveal protection levels whereas nontariff barriers tend to conceal them. As summed up by the IATRC Task Force on Tariffication and Rebalancing, "compared with the arbitrariness of licenses, the volatility of variable levies, the capriciousness of state trading and the uncertainty of quotas, a tariff is a benign trade barrier" (IATRC [1989], 2).

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[22] In some cases the discriminatory application of tariffs is permitted by the GATT. The special treatment that developing countries receive under the Generalized System of Preferences is one example. Free trade areas and custom unions are other forms of discriminatory treatment permitted by the GATT where member countries are favoured over countries outside the preferential zone.

Market Responsiveness

Tariffs foster market responsiveness by allowing variations in world prices to permeate domestic markets. In comparison to nontariff barriers, tariffs are not as obstructive to the market signals that are necessary for markets to function effectively. Market responsiveness facilitates competition and efficiency incentives in both importing and exporting countries. While importing nations may prefer the use of nontariff barriers to achieve local price stability, the use of tariffs, if widely adopted, may increase global stability. Unlike nontariff barriers which intensify instability in world markets, tariffs are amenable to augmenting stability in both exporter and importer markets. Another aspect of market responsiveness is that "tariffs also help to ensure that importing regions share in adjustments to market shares and trends" (*ibid.*, 2).

B. The Effects of a Tariff

Under competitive conditions, the production, consumption, and trade effects of the introduction of a tariff equivalent to nontariff barriers are analogous to the effects of imposing a tariff. These effects are analyzed graphically using a comparative static partial equilibrium framework. Trade barriers are excluded to begin the analysis in order to demonstrate the market effects of applying a tariff barrier. In this analysis the following assumptions are made:[23]

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[23] This section draws largely on Chapter 4 of Houck (1986).

(1) Unless indicated otherwise, the market is for a small country at some specific market level for a particular homogeneous commodity or commodity group.

(2) The substitutive and competitive responses of other commodities or commodity groups linked to the market under consideration can be suppressed.[24]

(3) The demand function for the commodity can be represented by the horizontal summation of all the individual, independent, short-run demand functions of the consumers of the commodity in the country, where other prices, income, tastes, and preferences are held constant.

(4) The supply function for the commodity can be represented by the horizontal summation of numerous independent, short-run supply functions of the producers of the commodity in the country, where other prices, input supply schedules, and technology are held constant.

(5) A relationship exists between the demand and supply function such that exchange of the commodity can occur only between the consumers and producers implicitly represented by the respective functions except where there is excess demand or excess supply.

(6) Competitive conditions exist in this market stemming from a sufficient number of small buyers and sellers who are essentially pricetakers and also from the absence of significant barriers to market entry or exit.[25]

(7) The market is open; hence, excess demand can be met by imports whereas excess supply can be exported, thereby allowing trade between countries.

The partial equilibrium construction is static, representing a single moment in time. Thus, a distinction can be made only between short-run and long-run effects. In Figure IV.1 depicting the effects of an *ad valorem* tariff, panel (a) represents the domestic market and panel (b) represents the international market. In panel (a), domestic production (Q_p) is determined by the domestic supply function (S_d). Domestic consumption (Q_c) is determined by the domestic demand function (D_d). Given assumption (7) of an open market (recall that initially no barriers to trade exist), the domestic price (P_d) is determined by international market forces, and therefore, equals the world price plus some margin for transportation and distribution. For the purposes of keeping the diagram uncluttered, these costs (while important) are not shown, and therefore $P_d=P_w$.

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[24] This assumption is required only to the extent that it simplifies the analysis.

[25] This assumption may not extend into the longrun as the tariff barrier might alter the market structure.

In the context of the small country assumption, the world price essentially serves as a perfectly elastic excess supply function [*ES (R)*] for the rest of the world as shown in Figure IV.1 (b). From Figure IV.1 (a), domestic production is represented by (Q_p), domestic consumption is represented by (Q_c), and the quantity imported is assumed to be the difference between consumption and production, that is, (Q_c-Q_p), or equivalently, (Q_m) in panel (b). Note that $(Q_c-Q_p)=Q_m$.

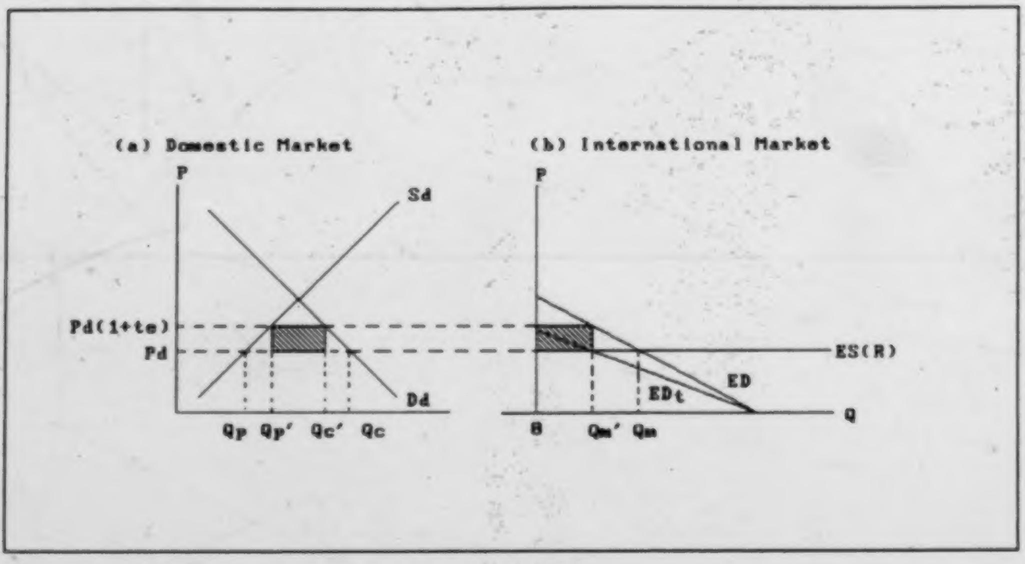

Figure IV.1 Effects of an *ad valorem* Tariff

Applying the tariff to this small-country, open market case essentially displaces the excess demand function (ED) by the percentage amount of the tariff, increasing the domestic price (P_d) by (te). In other words, the country's excess demand function depicted in the international market shifts to the pivotal position (ED_t) after the tariff is imposed. Domestic production is increased to (Q_p'), domestic consumption is decreased to (Q_c') and imports are displaced to (Q_m'), or alternatively, to (Q_c'-Q_p'). The revenue from the tariff that would accrue to the government is represented by the hatched area. Of course, if a nontariff barrier were already in place, the initial domestic price could be represented by $P_d(1+te)$ with all the appropriate corresponding levels of production, consumption, and imports. A tariff having an *ad valorem* rate equivalent to the rate at which the nontariff barrier would cause the domestic price to exceed the world price could be applied to the market to replace the nontariff barrier. The tariff equivalent would simply reflect the price gap resulting from the nontariff barrier, rather than increase the rate of protection, as is suggested by Figure IV.1.

C. The Equivalency of Tariffs and Quotas

Under conditions of perfect competition, an equivalency exists between tariffs and quotas. A nontariff barrier such as binding import quota, as shown in Figure IV.2(b), forces the excess demand function to shift to the vertical position (ED_q). The quantity restriction imposed on imports, therefore, is at (Q_m').

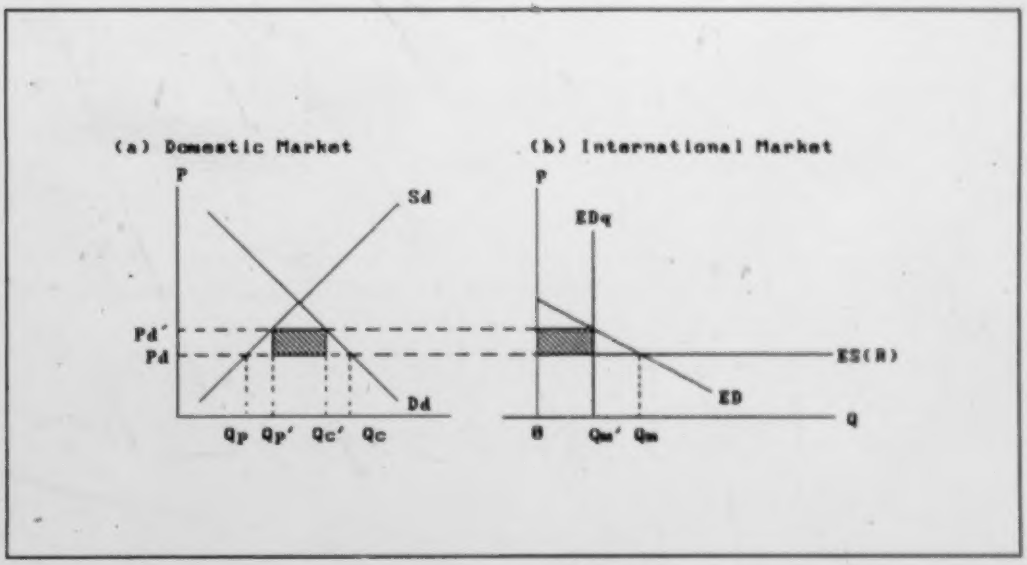
(a) Domestic Market
(b) International Market
P
Sd
Pd'
Pd
Dd
Qp
Qp'
Qc'
Qc
P
EDq
ES(R)
ED
Q
0
Qm'
Qm

Figure IV.2 Tariff and Quota Equivalency

In the small country case, the price effect of imposing a tariff or a quota is the same. That is, at (P_d'), an equivalent tariff (te) can be found such that $P_d'=P_d(1+te)$. The quota restriction on imports has a scarcity value which accrues as economic rent. This rent has the same value as the government revenues generated by the tariff. The government can capture the economic rent if it auctions the rights to holding the import quota. It may choose to distribute the rights free of charge on a first-come first-serve, historical or some other basis. In these cases, the importer typically would gain the rent. However, should imports be restricted by a variable export restraint agreement, the foreign exporter would be expected to appropriate the rent.

D. Nonequivalency Under Imperfect Competition

The equivalency between tariffs and quotas no longer applies under conditions of imperfect competition. Bhagwati (1965) demonstrates that the equivalency breaks down with the presence of monopoly elements in any one or more of the areas of foreign supply, domestic production, or quota allocation.

This has important implications for Canadian supply management marketing boards. These boards exercise monopoly power in the domestic market. They are able to control market entry by restricting production rights through the use of quotas. By limiting output levels, they are able to increase the prices of their products. Import quotas play an important role in this price enhancing ability.

Without the import quota restrictions, imports would increase the total supplies available to consumers and thereby depress the domestic price of the import-competing commodity. Thus, import quotas permit producers to be price makers by monopolizing the domestic market whereas tariffs leave producers as price takers (Anderson 1988, 4).

The nonequivalence of tariffs and quotas poses a problem for the tariffication process in imperfectly competitive markets such as those covered by national supply management schemes. One possible scenario of this nonequivalency is depicted in Figure IV.3.

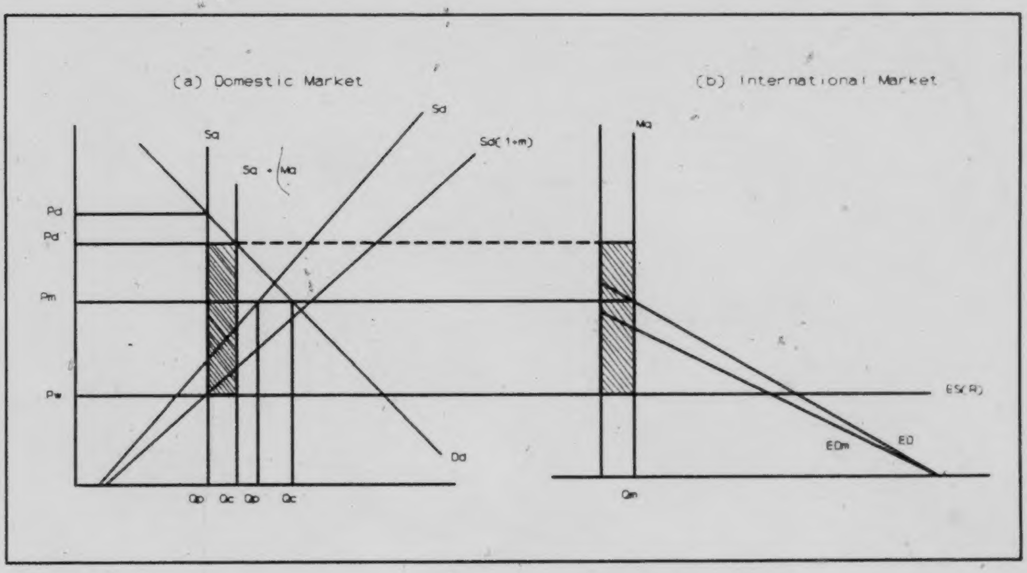
(a) Domestic Market
(b) International Market
Sd
Sq
Sd(1+m)
Sq + Mq
Mq
Pd
Pd'
Pm
Pw
ES(R)
EDm
ED
Dd
Qp
Qc
Qp
Qc
Qm

Figure IV.3 Tariff and Quota Nonequivalency

Here, the global import quota is a predetermined percentage (*m*) of the level of production.[26] The global import quota schedule is represented by a pivotal shift of the domestic supply function (S_d) to the position $S_d(1+m)$ to reflect the new schedule of total quantities available to domestic consumers at each price level in the domestic market (panel (a)). This is reflected in the international market by a pivotal shift of the country's excess demand curve for the product (*ED*) to the position (*EDm*) in panel (b). In panel (a), the domestic production quota is represented by the vertical domestic supply schedule (*Sq*). Given the domestic production quota (*Sq*), the total supply available to the domestic market (domestic production plus the imports determined by the global import quota) is at the vertical position (*Sq*+*Mq*). The revenue from the global import quota is represented by the hatched area. Domestic production is fixed at (*Qp*), domestic consumption at (*Qc*), and imports at (*Qc*-*Qp*) or alternatively, at (*Qm*) in Figure IV.3 (b). The domestic market is cleared at the domestic price (*Pd'*). Note that a tariff applied in this case to result in the price level (*Pd'*) would be prohibitive; that is, it would shut out imports entirely since there is no excess demand at (*Pd'*). To achieve the same level of imports as (*Qm*) through the use of a tariff, would require the domestic market to be cleared at

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[26] Note that in the case of poultry and eggs in Canada, the global import quota rate is applied to the previous year's production.

(*Pm*).[27] This price, however, is associated with a higher level of domestic production (*Qp*′) and a higher level of domestic consumption (*Qc*′).

Thus a tariff-quota equivalency does not exist in this imperfectly competitive situation. On the one hand, a tariff levied at the rate corresponding to the price level (*Pd*′) is associated with a level of consumption that could be met entirely by domestic production (imports would be squeezed out). On the other hand, a tariff levied at the rate corresponding to the level of imports (*Qm*) is associated with a different price level (*Pm*). Work done by Moschini and Meilke (1991) examining Canadian chicken broilers for the three year averaged period 1987-1989, suggests that the tariff associated with the domestic price level maintained by the support of production and import quotas is close to three times higher that the tariff which would preserve market access.

A practical approach to ensuring that a minimum level of imports is guaranteed could be tariffication with the use of a tariff-rate quota. A tariff-rate quota would be easier to derive than a tariff that preserves market access since the global import quota already exists. There would not be a ceiling on imports and any over-the-quota imports could be levied the full price-gap based tariff equivalent rate (Moschini 1991). The tariff-rate quota has also been proposed in the *US Submission*.

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[27] Note that this level of imports is not consistent with the amount of imports that would be required by the global import quota.

E. Limitations to Tariffication

Aside from the implications for market access under conditions of imperfect competition, there are a number of limitations to tariffication. In particular, difficulties surface in areas concerning policy coverage and domestic policy objectives, and also involve some empirical issues.

1. Policy Coverage

The underlying rationale of tariffication is to quantify, in either specific or *ad valorem* terms, all nontariff import barriers to trade. Import barriers include quotas, variable levies, minimum import prices, state trading, restrictive import licenses, and voluntary export restraint/import expansion agreements. One concern is that tariffication is specifically designed to deal with agricultural import protection. In effect, the tariffication process captures only those barriers which distort the domestic price of a commodity relative to the world price (or external reference price). Selective or ad hoc tariffication of some border measures and not others, however, may perpetuate problems of transparency and market isolation (IATRC [1989], 4). Subsidies, for instance, impact on world markets by increasing supplies, and in the case of large nations, by dampening world prices. Yet the indirect trade effects of some subsidies may not be amenable to quantification by the tariffication procedure. Consequently, reform in these areas would require the concurrent implementation of other reform measures.

Internal Support

Subsidies which lower the costs of production are an example of internal support measures which could remain undetected by tariffication. Input subsidies, for example, give domestic producers a competitive advantage over imports. Indirectly, by reducing the costs of important inputs like feed or fertilizers, they protect producers from imports and promote import substitution. Lower production costs cause the producers' variable costs of production to fall. An example of this is illustrated in Figure IV.4 depicting the market for a given commodity of a small nation.[28] Since the short-run domestic supply curve reflects marginal costs, a decrease in variable costs from an input subsidy would result in an outward shift, assumed here to be parallel, of the supply function from (Sd^0) to (Sd^1). Here, an importing nation is turned into an exporter, represented by the change in imports (Q_c-Q_p) to exports (Q_p'-Q_c).

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[28] The international market panel is not depicted here because the production subsidy does not affect the world price (*Pw*).

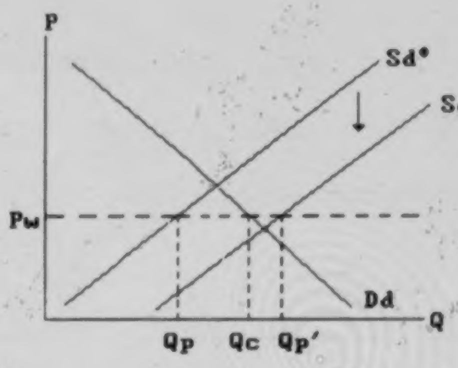

Figure IV.4 Subsidy-Induced Trade Reversal

In this example, since the domestic price is equal to the world price and neither price changes as a result of the subsidy, the tariff equivalent equals zero, despite the negative effects on the pattern of trade from squeezing out imports and, possibly, artificially stimulating exports.

Export Competition

Subsidies used to enhance export competition may also interfere with the implementation of tariffication. If an input, production, or export subsidy is applied in a large exporting nation (or the external reference country), the subsidy could depress the world price (or the external reference price). An example of this is shown in Figure IV.5. Unlike the small-country case, by definition a large exporting country's excess supply influences both prices and quantities available on the international market, and therefore, the excess supply curve depicted in the international market is positively sloped.[29] Thus, a shift in the domestic supply function from (Sd^0) to (Sd^1) representing the policy-induced change from the subsidy, shifts the nation's excess supply function to the right. The increase in the volume of the commodity on the international market forces the world price down to (P_w').

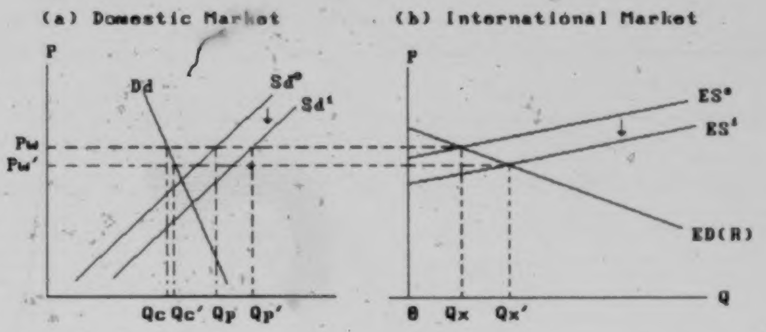
(a) Domestic Market
(b) International Market
P
Dd
Sd⁰
Sd¹
Pw
Pw'
Qc
Qc'
Qp
Qp'
P
ES⁰
ES¹
ED(R)
0
Qx
Qx'
Q

Figure IV.5 Trade Effect of a Subsidy, Large Country Case

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[29] This is based on similar analysis provided in Houck (1986, 103-104) which examines the small-country case of production subsidies and exports.

If import barriers are not used by the large exporting nation, the domestic price would fall with the world price (since the two prices are assumed to be equal, abstracting from transportation and distribution costs for simplicity). This benefits domestic consumers by increasing consumption from (Q_c) to (Q_c') and may benefit producers (given a price elasticity of supply equal to one or greater) by increasing total revenue. The costs of this sort of policy are borne by the taxpayer.

The ability of a large exporting nation to influence the world price, as in the case of Figure IV.5, has special implications for the tariffication approach. If large countries (or the external reference countries) are permitted to implement policies which depress world prices after the computation and binding process of the tariffication procedure has been carried out, other countries will appear to be increasing their levels of protection. This is because a falling world price widens the price spread between the domestic price and the world price (or the external reference price). Consequently, the tariff equivalent of a particular nontariff barrier calculated under the new conditions would exceed the tariff equivalent previously established.

2. Domestic Policy Objectives

While it is feasible to convert nontariff barriers to tariffs, it may not be wholly desirable from a policy perspective. Tariffs may not serve as a satisfactory substitute for certain domestic policies aimed at a particular problem. They may be clumsy and inefficient in achieving specific domestic policy objectives (IATRC [1989], 4).

Two main objectives of supply management are to provide producers with fair returns for their labour, management, and investment and to provide consumers with a continuous and adequate supply of high-quality products. Indirectly, these are sought through the objective to increase market stability. If bound tariffs are reduced over time, producer returns will become more reliant on the marketplace. Without the shelter of import quotas, producers may perceive that the returns from the market are not fair.[30] In addition, markets would not likely be as stable as they were previously under a supply management system reinforced with import quotas since they would not be isolated from imports. This suggests that the implementation of tariffication may be more widely accepted by producers if it were accompanied by policies which would enhance domestic market stability.

3. Empirical Issues

While the relative computational ease and minimal data requirements of tariffication are merits of this approach, they also increase the margin for inaccuracy.

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[30] The concept of "fair return" reflects the normative equity considerations that were prevalent during the formative years of the national agencies covering poultry products. The 1976 *Final Report* of the Food Prices Review Board points out that, on the one hand, "...it is virtually impossible to establish one level of fair returns for the majority of producers which does not convey excessive gains to the most efficient producers. On the other hand, a reasonable return for producers who run the most efficient operations (and who, in the case of most commodities, are responsible for the greatest proportion of overall production) would likely bankrupt a number of less efficient producers" (Food Price Review Board 1976, 37).

Specifically, the precise value of the tariff equivalent to nontariff barriers depends entirely on the set of prices and assumptions employed in the analysis. The optimal choice of data may not be available, requiring the use of alternate, possibly inappropriate, data. Another disadvantage of the tariffication approach, and others which rely on price comparisons, is the strong dependence of the measure on exchange rates (Zietz and Valdés 1988, 67). An appreciating exchange rate can increase the tariff equivalent of a particular nontariff barrier dramatically without any changes occurring in agricultural markets, import protection, or world prices. Conversely, a depreciating exchange rate could allow a country to increase the level of protection it provides to producers through input or production subsidies, deficiency payments, or other means. Even if the domestic price of the supported commodity increases, a depreciating exchange rate may offset or outweigh the price increase. Thus, a country could maintain the level of support bound by the fixed tariff equivalent rather than allowing it to fall in the spirit of the GATT's long-term objective of reducing agricultural support.

F. Methodology

The most basic method to convert nontariff barriers to tariffs is to calculate the price wedge that exists between the domestic price of a product and the world price of the same product in a common currency. This price wedge is considered a tariff equivalent to the nontariff barrier (or barriers) because, as Baldwin points out,

". . . under perfectly competitive conditions, an *ad valorem* tariff at this rate would yield the same wedge between the domestic and input prices" (1989, 10).[31] The tariff equivalent, thus, measures the rate at which the domestic price exceeds the world price, inclusive of transportation and distribution costs and any duties applied by the importing country. It can be formulated as follows:

$$te = \frac{P_d - P_w}{P_w} \times 100 \qquad \textbf{(IV.1)}$$

where *te* is the tariff equivalent,
Pd is the domestic price, and
Pw is the world price or external reference price adjusted for duties, transportation and distribution costs.

Once the rate at which the domestic price exceeds the landed world price is determined, it can be applied as a tariff to the market, replacing the nontariff barrier or barriers.[32]

G. Model Specifications

As previously discussed, under imperfect competition the effects of a tariff are not analogous to the effects of a quota. The estimated tariff equivalent to nontariff barriers under supply management captures both the effects of the import quota and the price enhancing effects of the production quotas that are capitalized into the quota as economic rent. Using a simple linear demand and supply model, Moschini and Meilke (1991) estimate the market price that would preserve the level of imports associated with the import quota. To do this, the model is comprised of an equation for demand and an equation for supply. The price that preserves the level of imports (*Pm* in Figure IV.3) is derived algebraically by equating the difference between the demand and supply curves with the difference between the observed quantity domestically consumed and the observed quantity domestically produced. (Implicitly this is the level of imports). This derived import-preserving price is then substituted into the tariff equivalent (Equation IV.1) to determine the import-preserving tariff equivalent estimate.

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[31] Note that the tariff equivalent is also called an implicit tariff, the nominal rate of protection, or the implicit rate of protection.

[32] Clearly, tariffication involves a policy change. Social and political factors must, therefore, also be considered in this process but are not considered here.

The particular model specifications of the Moschini and Meilke study (1991) for calculating import-preserving tariff equivalent estimates are as follows:

$$D = Q_D + \epsilon \frac{Q_D}{P_D}(P - P_D) \tag{IV.2}$$

$$S = Q_S + \eta \frac{Q_S}{P_S}(P - P_S) \tag{IV.3}$$

where	D	is defined as the linear demand curve for the product,
	Q_D	is defined as the actual quantity of the product domestically consumed,
	P_D	is defined as the realized domestic price at which the product is sold,
	ϵ	represents the price elasticity of demand,
	Q_S	is defined as the actual quantity of the product domestically supplied to the market,
	P_S	is defined as the domestic supply price of the product,
and	η	is the price elasticity of supply.

P becomes the import-preserving price (Pm) when $D\text{-}S = Q_D\text{-}Q_S$ is solved. That is,

$$P_m = \frac{\eta Q_S - \epsilon Q_D}{\eta \frac{Q_S}{\theta P_D} - \epsilon \frac{Q_D}{P_D}} \qquad \text{(IV.4)}$$

Since the supply price is not observable, θ is introduced as a supply price coefficient representing the departure from marginal cost pricing such that $P_S = \theta P_D$.

Once the market price (P_m) is derived, the import-preserving tariff equivalent estimate (t_m) can be calculated by substituting (P_m) into equation IV.1 such that,

$$t_m = \frac{P_m - P_w}{P_w} \times 100 \qquad \text{(IV.5)}$$

In keeping with the interpretation provided by Moschini and Meilke (1991), the parameters can be explained as follows.

Price Elasticity of Demand

The price elasticity of demand (ϵ) represents the percentage change in quantities demanded of a product given a percentage change in the price of that product at the point (Q_D, P_D). A low import-preserving tariff equivalent is characterized by an inelastic demand for the product. The tariff equivalent increases as the absolute value of the price elasticity of demand increases.

Price Elasticity of Supply

The price elasticity of supply (η) represents the percentage change in quantities of a product supplied to the market given a percentage change in its price at the point (Q_S, P_S). A low import-preserving tariff equivalent is characterized by an elastic supply of the product. The tariff equivalent increases as the price elasticity of supply decreases.

Supply Price Coefficient

The supply price coefficient (θ), as employed in the Moschini and Meilke study, represents the departure from marginal cost pricing at the wholesale level as a result of noncompetitive market conditions at the production level. As Moschini (1989) points out,

> Given that quotas confer a right to produce (at privileged prices) that extends into the future, they can be viewed as an asset and their value will equal some discounted form of present and future returns, these

> returns being the difference between price and marginal cost (*ibid.*, 383).

Given that supply management restricts output below the competitive level and that a scarcity value accrues to quotas, the relevant supply price reflecting marginal costs at the wholesale level is expected to be lower than the observed wholesale price. Essentially, θ indicates the "location" of the supply curve. Since the supply price is not observable, it must be derived. In the Moschini and Meilke study, θ is defined as a constant proportion of the observed market price, that is $P_S=\theta P_D$.[33]

Typically, the supply price coefficient is greater than zero and less than one. A low import-preserving tariff equivalent is characterized by a small supply price coefficient, representing a large departure from marginal cost pricing. As the supply price coefficient approaches a value of one, the margin decreases, suggesting less efficient production.

H. Previous Findings

Three recent studies have calculated estimates of tariff equivalents to import barriers for Canadian supply-managed poultry products. In compliance with a request from the GATT's Trade Negotiating Committee on Agriculture, Agriculture Canada (Canada [1990]) has calculated annual tariff equivalent estimates for a number of products including eggs, chicken, and turkey for 1986 to 1988. In their study examining tariffication with supply management, Moschini and Meilke (1991) have calculated annual tariff equivalent estimates for chicken for 1980 to 1989. Lastly, the US International Trade Commission (United States 1990) has calculated annual tariff equivalent estimates for several commodities, including Canadian eggs, chicken, and turkey for 1986 to 1988 in conjunction with the United States' agricultural trade reform proposal. These studies compute specific and *ad valorem* tariff equivalent estimates of both tariff and nontariff barriers. A summary of the results of these studies is presented in Table IV.1.

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[33] Note that when $\theta=1$, $P_S=P_D$

These estimates should be compared with discretion as dissimilarity in data and methodology has resulted in differences in the estimates. Briefly, the differences in the estimates for eggs are a result of the different methodologies used. Differences in the estimates for chicken between the Agriculture Canada and the Moschini and Meilke studies are the result of differing methodologies and a slightly different transportation cost estimates. The difference between the Moschini and Meilke and the US International Trade Commission estimates for chicken can be attributed to lower transportation cost estimates and higher US prices in the US International Trade Commission estimates. Differences in the turkey estimates between the Agriculture Canada and the US International Trade Commission estimates can be attributed to different methodologies, considerably lower transportation costs estimates used in the US International Trade Commission estimates, and differing price series. A more detailed account of the comparability can be found following Table IV.1.

Table IV.1 Summary of Tariff Equivalent Estimates from Different Studies for Eggs, Chicken, and Turkey, 1986 - 1988[a,b,c]

Commodity	Agriculture Canada		Moschini and Meilke		US International Trade Commission	
Eggs	CN¢/doz	%			CN¢/doz[d]	%
1986	12.71	12.3			12.40	12.5
1987	27.82	32.1			27.78	36.4
1988	44.37	54.5	Not examined		27.41	34.9
Average	28.30	32.9			22.53	27.9
Chicken	CN¢/kg	%	CN¢/kg	%	CN¢/kg[d]	%
1986	34.49	18.8	32.70	18.7	26.95	14.6
1987	59.44	40.0	58.60	42.1	43.08	29.1
1988	48.97	30.1	49.00	32.1	19.14	11.8
Average	47.63	29.6	46.77	31.0	29.72	18.5
Turkey	CN¢/kg	%			CN¢/kg[d]	%
1986	54.86	23.8			64.30	27.7
1987	93.24	52.1			102.23	58.1
1988	98.17	55.9	Not examined		43.68	25.2
Average	82.09	43.9			70.07	37.0

Notes:

a. These tariff equivalent calculations estimate both tariff and nontariff barriers to trade.

b. Slight differences may occur due to rounding.

c. Average transportation cost estimates for the 1986-1989 period utilized in the studies for eggs, chicken, and turkey respectively are:

Agriculture Canada 5 CN¢/doz, 10 CN¢/kg, 10 CN¢/kg;
Moschini and Meilke n/a, 11 CN¢/kg, n/a;
US Trade Commission 5 CN¢/doz, 7 CN¢/kg, 6 CN¢/kg.

d. These specific tariff equivalent estimates have been converted to Canadian currency (using the annual exchange rate figures provided in Appendix B).

1. Data Comparability

For the most part, the prices used in these studies are comparable, with the exception of 1988. It appears that the prices used for 1988 by the US International Trade Commission were preliminary, and therefore, resulted in considerable deviations from the other studies for this year.

Eggs

The Agriculture Canada and the US International Trade Commission studies both report using the same price series for eggs. They use annual average wholesale prices for Grade A large shell eggs in the Toronto market to represent the Canadian domestic price series and annual US average wholesale prices of Grade A large shell eggs to represent the world price series.

Chicken

The Agriculture Canada study uses annual weighted average prices of wholesale Canada Grade A eviscerated chicken under two kilograms to represent the Canadian domestic price series for chicken. The Moschini and Meilke study uses annual wholesale prices of chicken in Ontario to represent the Canadian domestic price series while the US International Trade Commission study uses annual weighted average processor prices for Canada Grade A eviscerated chicken under two kilograms in the Toronto market. All three studies use annual US 12-city composite wholesale chicken broiler prices to represent the world reference price series.

Turkey

The Agriculture Canada study uses annual weighted average wholesale prices for consumer-pack Canada Grade A hens of five to eight kilograms in the Toronto market to represent the Canadian domestic price series for turkey while the US International Trade Commission study uses annual weighted average wholesale prices of heavy toms of eight kilograms and over (eviscerated weight) to represent the Canadian domestic market. To represent the world price series, the Agriculture Canada study uses annual New York monthly-averaged wholesale prices of frozen consumer-pack US Grade A hens of eight to 16 pounds (3.6 to 7.2 kilograms) whereas the US International Trade Commission study uses annual average wholesale prices for young toms of 14 to 22 pounds (6.4 to 10 kilograms) in the Eastern United States market.

Price Adjustments

In the Agriculture Canada and the Moschini and Meilke studies, the world reference price series are converted to Canadian currency. In the US International Trade Commission study, the Canadian prices are converted to US currency. For comparison purposes, the US International Trade Commission specific tariff equivalent estimates are presented in Canadian dollar values (converted using the annual exchange rate figures provided in Appendix B).

In all three studies, the US price series are adjusted for transportation costs. The Agriculture Canada and the Moschini and Meilke studies apply the transportation costs to the US price after conversion to Canadian currency. Moschini and Meilke base transportation costs on an estimate of US $1,450 per 40,000 pound truckload which is about US $0.08 per kilogram. This value is assumed to be constant for the period 1980-1989 except where annual differences occur as a result of the conversion to Canadian currency. Although their estimates differ, the Agriculture Canada and the US International Trade Commission studies both use estimates of refrigerated trucking costs obtained from Ward and Farris (1990) for chicken and turkey broilers and estimates provided by industry sources for shell eggs. The average transportation cost estimates used in these studies for the period 1986-1988 are presented in the notes of Table IV.1.

2. Methodological Comparability

Differences in the *ad valorem* tariff equivalent estimates are partly due to the method used to calculate the estimates. In particular, the US International Trade Commission and the Moschini and Meilke studies divide the specific tariff equivalent by the US price unadjusted for transportation costs (T) to calculate the *ad valorem* tariff equivalent (that is, $te=(PD-PUS-T)/PUS$), whereas Agriculture Canada divides the specific tariff equivalent estimate by the transport adjusted US prices (that is, $te=(PD-PUS-T)/(PUS+T)$). Recall that the tariff is not netted out from these calculations.

3. Import-Preserving Tariff Equivalents

To determine the tariff that would be required to maintain the level of imports permitted to cross the border under the import quota restriction, Moschini and Meilke (1991) estimate import-preserving tariff equivalents for Canadian chicken broilers. They estimate an average *ad valorem* import-preserving tariff equivalent of 15.4 percent for the period 1987-1989 ranging from -0.4 percent to 29.6 percent, depending on the set of assumptions utilized in the model.

I. Tariff equivalent Estimation Procedures

The following sections describe the tariff equivalent estimation procedures applied in this study. The focus will be on testing the hypotheses outlined in the introduction. To begin, a description of the data and assumptions is provided. Annual estimates of tariff measures equivalent to nontariff barriers for Canadian shell eggs, chicken broilers, and turkey broilers are presented for the period 1980 to 1989 in the section to follow. Tests and results on market level, variability, and import-preserving estimations are in the final sections.

1. Data Description

As mentioned previously, the choice of price series used in calculating the tariff equivalent estimates has a direct impact on the value of the measure. This applies to the choice of market level as well as to the choice of the domestic and the external reference country price series.

Market Level

By choosing a relevant market level, problems related to isolating the effects of nontariff barriers without capturing the effects of other factors that also contribute to the price spread can generally be avoided. Retail prices are not likely to be an appropriate series to compare because retailers in Canada and the United States use eggs, chicken, and turkey as loss leaders to attract consumers to their stores (Katz 1990, 40; Smith 1990, 20). A closer examination of the appropriateness of wholesale and farmgate market prices is pursued in Section K.

Prices

In the case of poultry products regarding the choice of prices, both Canada and the United States have a variety of price series reported by federal departments of agriculture on a monthly basis and averaged over a given quarter or year. Series which represent a region rather than a specific location are usually weighted by production. While location-specific prices can be compared with more accuracy because better transportation cost estimates can be made, the data are not readily available through the major statistical publications. This study has attempted to use location-specific prices that represent major markets for poultry products and are within close proximity of each other. In cases where these are not available, the next closest area or region has been selected. Once the price series are selected, they are used as nominal prices rather than converted to real prices. Nominal prices appear to serve these purposes, since the tariff equivalent estimates are based on price differences across the same period.

Domestic Prices

This study uses average prices from the Ontario market (Toronto, in some cases) to represent the Canadian price series at the wholesale level. The Canadian price series at the farmgate level is represented by nationally weighted average prices paid to producers for eggs, and by average prices from the Ontario market for chicken and turkey broilers. Ontario prices appear to be the most appropriate to represent the Canadian price series used in the tariff equivalent estimate calculations. Ontario has the largest number of broilers and hens in Canada. From 1985 to 1989, Ontario's share of total chicken broilers and hens in Canada was between 34 and 35 percent, its share of laying hens was between 37 and 38 percent, and its share of turkeys in Canada was between 34 and 39 percent (Agriculture Canada 1991). In addition to being a major production region, Ontario is also a major domestic market for consumption of poultry and eggs. Retail price trends of chicken broilers in Ontario during 1988 and 1989 suggest that provincial production has not been able to meet demand (Katz 1990, 50).

External Reference Country Prices

This study uses average prices from local US markets (New York), combined markets (12-city composite average), and regionally-weighted average prices to represent the external reference prices at the wholesale level. Nationally-weighted average prices received by producers are used to represent the farmgate level. US prices appear to be the most appropriate external reference prices to use in the tariff equivalent estimate calculations for the following reasons. First, both the perishability of poultry products and the proximity and scale of US production facilities suggest that the United States is a potential source of greater poultry and egg imports to the Canadian market. Second, the United States has supplied historically most imports of eggs, chicken, and turkey to the Canadian market. The United States is the largest poultry producer in the world. US producers accounted for nearly 28 percent of global output in 1988 (Bishop *et al* 1990, 7). Third, Agriculture Canada, the USDA, and the OECD have all compared Canadian prices to US prices of poultry products in the past. Thus, the use of US prices to represent the external reference country price series appears to be widely accepted.

Reference Price Adjustments

The US price series are adjusted in order to approximate import prices. Specifically, they are converted to Canadian dollars and adjusted to reflect recent transportation costs based on estimates between likely US points of origin and Toronto. Import tariffs that are applied at the border are added to the US price series after conversion to Canadian dollars. Other costs that may be incurred in the handling and distribution of the products, such as insurance and brokerage fees, are excluded.

Exchange Rate Adjustment: US prices are converted to Canadian dollars using the average annual market exchange rate reported in the *Bank of Canada Review* (Bank of Canada 1980-1990).

Transportation Costs: Accurate transportation costs are difficult to determine because they are location- and time-specific and because information on refrigerated trucking rates is difficult to obtain given the confidentiality of the data. As the poultry and egg industries are becoming more vertically integrated, costs are becoming increasingly obscured. In this thesis study, the cost of transportation is assumed to be a percentage markup of the price per unit for each product over the ten year period. Refrigerated trucking cost estimates for chicken and turkey broilers are taken from Ward and Farris (1990) and shell egg transportation cost estimates are from US industry sources, all of which are provided in *Estimated Tariff Equivalents of Nontariff Barriers on Certain Agricultural Imports in the European*

Community, Japan, and Canada (United States 1990). These estimates are based on average rates for various shipping distances and then converted to a cost per unit basis. Georgia, Northwest Arkansas, and Carolina are taken to be the points of origin for shell eggs, chicken broilers, and turkey broilers, respectively. Toronto is taken to be the destination for all three poultry products. The annual per unit transportation costs are divided by the annual US prices provided in the US tariff equivalent study cited above in order to obtain a percentage and then averaged over the three year period 1986-1988 to derive the average percentage transportation markup. This results in a six percent markup for eggs, a four percent markup for chicken, and a three percent markup for turkey.[34] While this method accounts for inflation to some degree, it abstracts from any technological change in the refrigerated trucking industry that would alter the costs of trucking and also from variations in fuel costs, distance, and other variables that affect transportation.

Import Tariffs: In addition to import and production quotas, import tariffs were also in effect during the period under study.[35] Canadian import tariffs have been added to the US price series in order that the tariff equivalent estimates measure the nontariff barriers to trade only. The import tariff rates were constant from 1980 to 1989, but are scheduled to be phased out by 1998 in accordance with the Canada-

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[34] The USDA transportation cost estimates for chicken broilers approximate estimates derived by Easterling *et al* (1986). The Easterling *et al* study uses a constant cost factor of US $1.1602 per mile for a 35,000 pound truckload of ready-to-cook broilers.

[35] Global import quotas are set at a percentage of the previous year's domestic production. The rates are as follows: 1.67% for shell eggs, 7.5% for chicken, and 3.5% for turkey.

United States Free Trade Agreement (Agriculture Canada 1980; 1987). The tariff rates are provided in the sections to follow.

Eggs

Wholesale Prices

Tariff equivalent estimates for the wholesale egg market are calculated using annual averages of monthly-averaged wholesale prices (expressed in dollars per dozen) from 1980 to 1989. The domestic price series is represented by the annual weighted average wholesale price for Grade A large eggs in the Toronto market reported by Agriculture Canada (1980-1989) in annual issues of *Poultry Market Review.* The world price series is represented by the US average wholesale price for Grade A large eggs in the New York City market reported by the United States Department of Agriculture (1990a) in *US Egg and Poultry Statistical Series, 1960-89.* The US price series has been converted to Canadian dollars and adjusted by a markup of six percent for transportation costs and an additional 3.5 cents per dozen to account for the import tariff in effect until 1989.

Farmgate Prices

Tariff equivalent estimates for the egg market at the farmgate level are calculated using annual averages of monthly-averaged FOB farmgate prices of all grades of shell eggs (including eggs for hatching), from 1980 to 1989. The domestic price series is represented by the nationally-weighted average price per dozen paid to producers reported by Agriculture Canada in annual issues of *Poultry Market Review*. The world price series is represented by the nationally- weighted annual average US FOB farmgate price of shell eggs per dozen received by producers. This series is reported by the United States Department of Agriculture (1990a) in *US Egg and Poultry Statistical Series, 1960-89*. Like the wholesale price series, the US farmgate price series is converted to Canadian dollars and adjusted by a markup of six percent for transportation costs and an additional 3.5 cents per dozen to account for the import tariff in effect until 1989.[36]

Supplies

Figures for egg production, beginning and ending stocks, imports, exports, and eggs used for hatching are reported by kilotonnes in Table 161 of the *Handbook of Food Expenditures, Prices and Consumption* (Agriculture Canada 1990). Disposition of supplies, given as production plus beginning stocks plus imports less exports and eggs used for hatching, is treated as the quantity of the product domestically consumed. The quantity of the product domestically supplied to the market is defined as production plus net stocks less exports. The import-preserving calculations of equations IV.2, IV.3, and IV.4 require these quantities.

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[36] The relative rate of transportation costs is maintained to ensure comparability between the estimates of different market levels.

Chicken

Wholesale Prices

Tariff equivalent estimates for the wholesale chicken market are calculated using annual averages of monthly-averaged wholesale prices (expressed in dollars per kilogram) from 1980 to 1989. The domestic price series is represented by the annual weighted average processor price for Grade A fresh eviscerated chicken broilers under four pounds (two kilograms) in the Toronto market reported by Agriculture Canada (1980-1989) in annual issues of *Poultry Market Review*. The world price series is represented by the US 12-city composite wholesale price for ready-to-cook chicken broilers reported by the United States Department of Agriculture (1990a) in *US Egg and Poultry Statistical Series, 1960-89*. The US price series is converted to Canadian dollars and adjusted by a markup of four percent for transportation costs and an additional 12.5 percent to account for the import tariff in effect until 1989.

Farmgate Prices

Tariff equivalent estimates for the chicken market at the farmgate level are calculated using annual averages of monthly-averaged FOB liveweight farmgate prices of chicken broilers under five pounds (2.3 kilograms) converted to an eviscerated basis for the period 1980 to 1989. Both the Canadian and the US price series were converted to eviscerated equivalents using a conversion factor for chicken for each year defined as:

$$CF_t^{chicken} = 1.23 + (n-1)\left(\frac{1.33-1.23}{29}\right) \quad \text{(IV.6)}$$

where *t=1960,..,1989*	indicates the year of the particular conversion factor;
n=1,..,30	represents the number of years that correspond to *t* (for example when *t=1960, n=1,* etc.);
1.23	is the conversion factor for chicken broilers in 1960 (Agriculture Canada 1978).
1.33	is the conversion factor for chicken broilers in 1989 (Agriculture Canada 1989a).

The domestic price series is represented by prices received by producers of Ontario broilers less than five pounds (2.3 kilograms) liveweight reported by Agriculture Canada in the *Handbook of Selected Agricultural Statistics* (for 1980-85) and annual issues of *Poultry Market Review* (for 1986-89). The world price series is represented by nationally-weighted average US FOB farmgate prices from two to five pounds (0.9 to 2.3 kilograms) liveweight. This series is reported by the United States Department of Agriculture (1990a) in *US Egg and Poultry Statistical Series, 1960-89*. Like the wholesale price series, the US price series is converted to Canadian dollars and adjusted by a markup of four percent for transportation costs and an additional markup of 12.5 percent to account for the import tariff in effect until 1989.

Supplies

Figures for chicken production, beginning and ending stocks, imports, and exports are reported by kilotonnes based on eviscerated weight from Table 162 of the *Handbook of Food Expenditures, Prices and Consumption* (Agriculture Canada 1990). Disposition of supplies, given as production plus beginning stocks plus imports less exports, is treated as the quantity of the product domestically consumed. The quantity of the product domestically supplied to the market is defined as production plus net stocks less exports. The import-preserving calculations of equations IV.2, IV.3, and IV.4 require these quantities.

Turkey

Wholesale Prices

Tariff equivalent estimates for the wholesale turkey market are calculated using annual averages of monthly-averaged wholesale prices (expressed in dollars per kilogram) from 1980 to 1989. The domestic price series is represented by the annual weighted average processor price for Grade A fresh eviscerated turkey broilers between ten and 16 pounds (five to eight kilograms) in the Toronto market reported by Agriculture Canada (1980-1989) in annual issues of *Poultry Market Review*. The world price series is represented by the US wholesale price in the East for eviscerated young hen turkeys between eight and 16 pounds (3.6 to 7.3 kilograms) reported by the United States Department of Agriculture (1990a) in *US Egg and*

Poultry Statistical Series, 1960-89. The US price series is converted to Canadian dollars and adjusted by a markup of three percent for transportation costs and an additional 12.5 percent to account for the import tariff in effect until 1989.

Farmgate Prices

Tariff equivalent estimates for the turkey market at the farmgate level are calculated using annual averages of monthly-averaged FOB liveweight farmgate prices of turkey broilers between 4.5 and nine kilograms converted to an eviscerated basis for the period 1980 to 1989. Both the Canadian and the US price series were converted to eviscerated equivalents using a conversion factor for turkey for each year defined as:

$$CF_t^{turkey}=1.18+(n-1)\left(\frac{1.22-1.18}{29}\right) \qquad \textbf{(IV.7)}$$

where	$t=1960,..,1989$	indicates the year of the particular conversion factor;
	$n=1,..,30$	represents the number of years that correspond to t (for example when $t=1960$, $n=1$, etc.);
	1.18	is the conversion factor for turkey broilers in 1960 (Agriculture Canada 1978).
	1.22	is the conversion factor for turkey broilers in 1989 (Agriculture Canada 1989a).

The domestic price series is represented by prices received by producers of Ontario broilers from ten to 20 pounds (4.5 to nine kilograms) liveweight reported by Agriculture Canada in annual issues of *Poultry Market Review*. The world price series is represented by nationally-weighted average US FOB farmgate liveweight prices for turkey broilers. This series is reported by the United States Department of Agriculture (1990a) in *US Egg and Poultry Statistical Series, 1960-89*. Like the wholesale price series, the US price series is converted to Canadian dollars and adjusted by a markup of three percent for transportation costs and an additional markup of 12.5 percent to account for the import tariff in effect until 1989.

Supplies

Figures for turkey production, beginning and ending stocks, imports, and exports are reported by kilotonnes based on eviscerated weight from Table 163 of the *Handbook of Food Expenditures, Prices and Consumption* (Agriculture Canada 1990). Disposition of supplies, given as production plus beginning stocks plus imports less exports, is treated as the quantity of the product domestically consumed. The quantity of the product domestically supplied to the market is defined as production plus net stocks less exports. The import-preserving calculations of equations IV.2, IV.3, and IV.4 require these quantities.

J. Tariff Equivalent Estimates Based on Wholesale Prices

Using the method, assumptions, and data described in the previous sections, annual tariff equivalent estimates of nontariff barriers were calculated for Canadian shell eggs, chicken broilers, and turkey broilers for 1980 to 1989. The estimates, expressed in *ad valorem* rates and based on wholesale prices, are presented in Table IV.2. Specific NTB tariff equivalent estimates are represented by the spreads between the Canadian and the US prices (adjusted for transportation costs and the import tariff) in Figures IV.6 to IV.8.

1. Comparison with Previous Results

The NTB tariff equivalent estimates provided in Table IV.2 are based on the percentage difference between the domestic price and the US price adjusted for transportation costs and the current tariff (that is $te=(P_D-P_{US}-T-t)/(P_{US}+T+t)$). For comparison purposes with Table IV.1, the tariff equivalent estimates reflecting both the tariff and the nontariff barriers are also presented (in this case $te=(P_D-P_{US}-T)/(P_{US}+T)$). The differences that occur between the tariff and NTB tariff equivalent estimates in Tables IV.2 and IV.1 are largely due to lower transportation cost estimates used in this study.[37] Note that the average tariff equivalent estimates for the period 1986-1988, are higher than the previously estimated measures in Table IV.1 for all commodities once the current import tariff is added to the NTB tariff equivalent estimates. The methodology used here deviates from the Moschini and Meilke and the US International Trade Commission studies which calculate the percentage difference using the unadjusted US price in the denominator. There is a considerable variation in the results of the two methods. Since the denominators in the Moschini and Meilke and the US International Trade Commission studies are smaller, the *ad valorem* rates are actually larger than the rate calculated using the adjusted US price in the denominator. Nevertheless, the assumed transportation costs for chicken and turkey broilers are lower in the measures of this study than in the Agriculture Canada, Moschini and Meilke, or the US International Trade Commission studies, and therefore result in higher estimates overall. Effectively, the method employed here which includes transportation costs and the current tariff in the denominator measures the protection provided from nontariff barriers determined by the price gap between two products designated to be in the same location. This latter method is also used to calculate the import-preserving tariff equivalent estimates presented in Tables IV.7 to IV.9.

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[37] The 1986-1988 average transportation costs used in this study were $0.05 per dozen for eggs, $0.06 per kilogram for chicken, and $0.05 per kilogram for turkey.

Table IV.2 Results: Tariff Equivalent Estimates Expressed as *ad valorem* Rates for Selected Canadian Poultry Products Based on Wholesale Prices, 1980-1989

Year	Eggs NTB only	Eggs tariff & NTB	Chicken NTB only	Chicken tariff & NTB	Turkey NTB only	Turkey tariff & NTB
1980	17.43	22.39	5.37	18.03	6.70	19.65
1981	18.70	23.17	33.62	49.68	35.64	52.10
1982	17.33	21.81	30.11	45.75	33.19	49.35
1983	13.00	17.02	30.41	46.09	26.25	41.57
1984	19.66	23.43	24.72	39.71	6.49	19.41
1985	19.26	23.61	14.15	27.87	11.08	24.56
1986	7.76	11.37	7.66	20.60	11.99	25.58
1987	27.55	32.71	29.30	44.85	45.12	62.73
1988	47.88	54.27	18.89	33.18	42.67	59.99
1989	28.29	32.66	38.12	54.72	35.42	51.86
Standard Deviation	11.00	11.71	11.21	12.55	15.08	16.91
Coefficient of Variation (%)	50.71	44.61	48.26	33.00	59.25	41.56
Average (1980-1989)	21.69	26.24	23.23	38.05	25.45	40.68
Average (1986-1988)	27.73	32.78	18.62	32.87	33.26	49.43
Average (1986-1989)	27.87	32.75	23.49	38.33	33.80	50.04
Average (1987-1989)	34.58	39.88	28.77	44.25	41.07	58.19

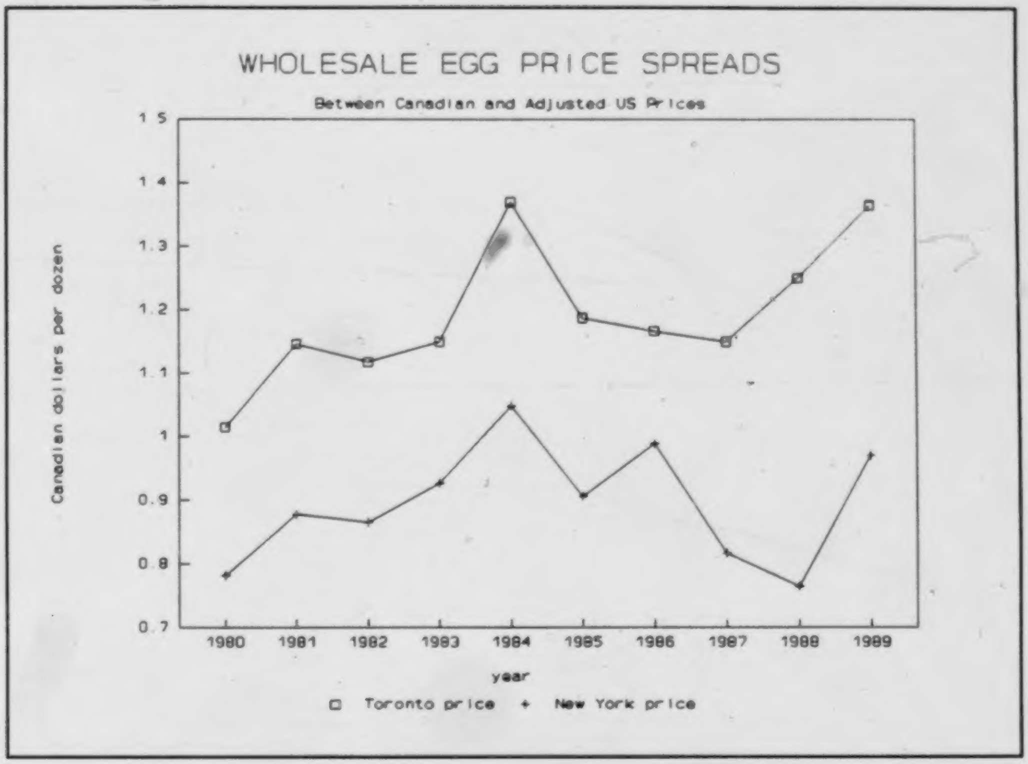

Figure IV.6 Wholesale Price Spreads Between Canadian and Adjusted US Prices for Eggs, 1980 - 1989

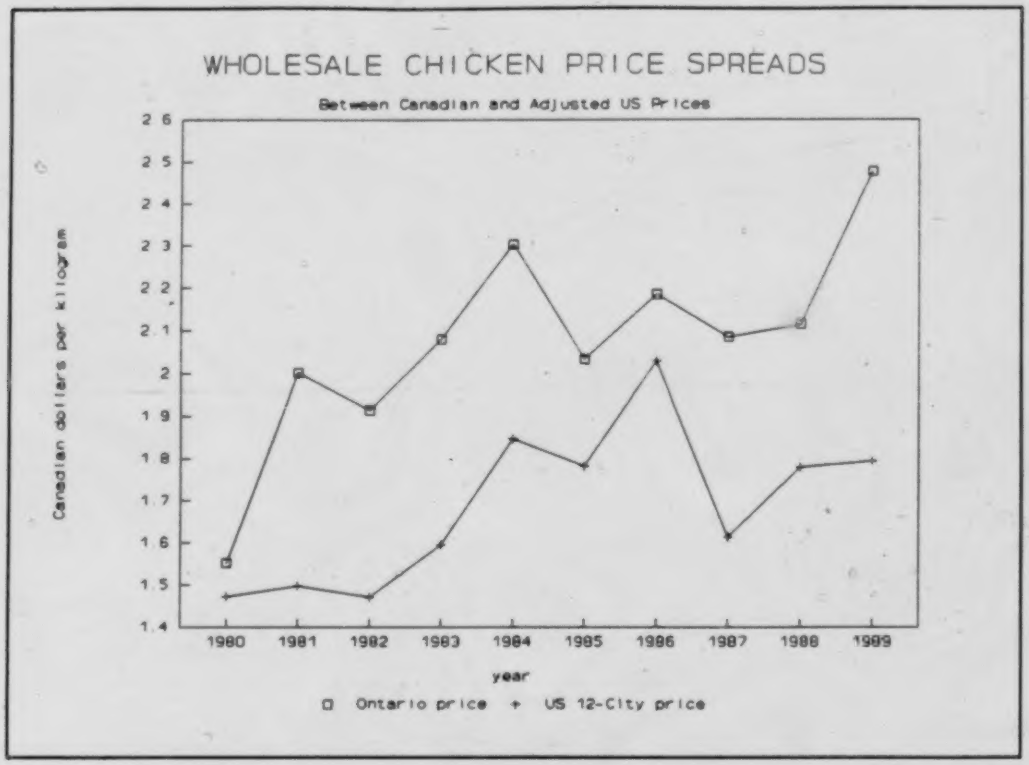

Figure IV.7 Wholesale Price Spreads Between Canadian and Adjusted US Prices for Chicken, 1980 - 1989

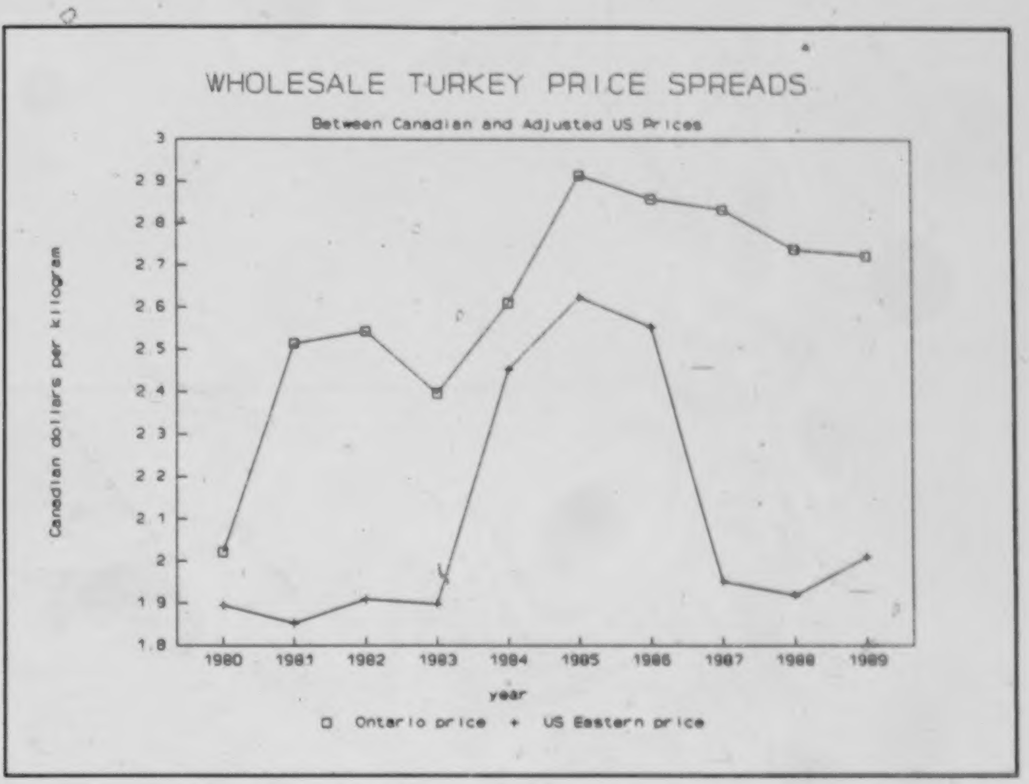

Figure IV.8 Wholesale Price Spreads Between Canadian and Adjusted US Prices for Turkey, 1980 - 1989

2. Discussion of Tariff Equivalent Calculations

The following observations can be made from Table IV.2 (which provides the *ad valorem* wholesale-based tariff equivalent estimates calculated in this study) and from Figures IV.6 to IV.8 (which depict the specific wholesale-based NTB tariff equivalent estimates as the spread between the Canadian price series and the transport- and tariff-adjusted US price series). The estimated NTB tariff equivalent estimates for eggs and turkey broilers appear to have trended upward while the trend of the estimates for chicken broilers is less clear. On average, the estimated NTB tariff equivalents were highest for turkey, then chicken and eggs. Provided that an adequate markup was applied to account for the costs of transportation and distribution, the higher tariff equivalent estimates suggest that the Canadian turkey broiler industry may be less competitive relative to its US counterpart than either the egg or the chicken broiler industries. The general decline of the estimates in 1986 coincides with an exchange rate of CN $1.39 per US dollar -- the highest average rate of the decade. This exchange rate may have been the major factor contributing to the narrowing price spread in 1986. Demand and supply conditions also appear to have influenced the price series of these commodities.

The increases in both Canadian and US prices of chicken between 1980 and 1984 appear to be demand-driven resulting from higher sales of fast food and further-processed chicken. As can been seen in Appendix B, in 1984 Canadian imports of chicken increased substantially. This may be because domestic production lagged behind a rapidly expanding demand (Miller 1984, 35). Per capita consumption of chicken in the United States appears to have expanded at a faster rate than in Canada, as indicated in Table IV.3.

Two major contributing factors to the drastic swing in US turkey prices between 1983 and 1987 were serious flock losses from an epidemic of avian influenza

(Laflamme 1984, 36) and rapidly expanding demand in the United States for turkey and turkey products. The success of the US turkey industry in developing and promoting new turkey products may be a factor in the rapid growth of per capita consumption of turkey in the United States as shown in Table IV.3.

Table IV.3 Per Capita Disposition of Selected Canadian Poultry Products in Canada and the United States Expressed in Kilograms, 1980-1989

Year	Eggs		Chicken		Turkey	
	Canada	US	Canada	US	Canada	US
1980	12.9	15.6	17.2	22.6	4.3	4.8
1981	12.7	15.2	17.0	23.3	4.2	4.9
1982	12.7	15.2	17.3	23.9	4.0	4.9
1983	12.4	15.0	17.3	24.2	4.1	5.1
1984	11.9	14.9	18.3	25.0	4.0	5.1
1985	11.6	14.7	19.8	26.1	4.0	5.4
1986	11.8	14.5	20.5	26.6	4.2	6.0
1987	11.5	14.6	21.7	28.4	4.4	6.9
1988	11.4	14.1	22.7	29.3	4.5	7.2
1989	11.1	13.5	22.1	30.9	4.5	7.7
Standard Deviation	0.6	0.6	2.2	2.8	0.2	1.1
Coefficient of Variation (%)	5.1	4.2	11.5	10.6	4.8	18.7
Average (1980-1989)	12.0	14.7	19.4	26.0	4.2	5.8

The following sections investigate questions that arise from the results of the tariff equivalent estimates and procedures. First, the appropriateness of using farmgate prices is addressed. NTB tariff equivalent estimates are recalculated using farmgate prices to compare to the wholesale estimates. The issue of variability is explored in the section to follow. All three poultry product sets of wholesale NTB tariff equivalent estimates reveal a considerable degree of variability from one year to the next. It would be useful to be able to identify the source or sources of the variability. The last section addresses some issues which arise using the import-preserving approach to calculating tariff equivalent estimates.

K. Wholesale versus Farmgate Prices

As previously noted, it is essential to isolate in the tariff equivalent measure the effects of nontariff barriers without capturing the effects of other factors that also contribute to the spread between the domestic and the external reference prices. Intuitively, the further along the marketing channel the prices are chosen, the more likely other factors contributing to the price spread are to occur. In the case of supply-managed poultry products, a production distortion occurs at the producer level through a system of production quotas and administered pricing which is reinforced at the wholesale level by import quotas. Processors and wholesalers pay higher prices to producers for poultry products than would be expected under more competitive market conditions.[38] This suggests that the difference between the domestic and the world or external reference price of a product at the farmgate level may reflect the nontariff barrier captured by the tariff equivalent estimates. Additionally, domestic and foreign poultry products are likely to be more comparable at the farmgate level than at market levels further down the distribution channel where the product may be differentiated and may have value-added. Nevertheless, the import quota also contributes to the price distortions of supply management. These effects might not be captured at the farmgate level. Moreover, most international trade in poultry products occurs at the wholesale level which suggests that the wholesale prices may be more appropriate. A drawback may exist, however, if the wholesale prices reflect other market peculiarities such as vertical integration. This could misstate the value of the spread between the domestic and the external reference price, and therefore, may be unsuitable for use in Equation IV.1.[39]

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[38] In some cases, however, processors may pay lower prices. This may occur if the agency differentiates its pricing in order to remove a surplus.

Annual NTB tariff equivalent estimates using farmgate prices were calculated for Canadian shell eggs, chicken broilers, and turkey broilers for 1980 to 1989. The estimates, expressed in *ad valorem* rates, are presented in Table IV.4. Specific NTB tariff equivalent estimates based on farmgate prices are represented by the spreads between the Canadian and the US prices which are adjusted for transportation costs and the import tariff in Figures IV.9 to IV.11.

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[39] Nevertheless, a recent study has found Canadian poultry processors to be relatively competitive in the food processing industry (Cahill and Hazledine 1989).

Table IV.4 Results: NTB Tariff Equivalent Estimates Expressed as *ad valorem* Rates for Selected Canadian Poultry Products Based on Farmgate Prices, 1980-1989

Year	Eggs	Chicken	Turkey
1980	7.20	12.58	8.44
1981	9.64	27.75	26.19
1982	9.36	26.01	24.33
1983	4.54	16.18	23.85
1984	-2.36	7.02	0.05
1985	8.72	2.80	-10.08
1986	-2.17	-11.22	-9.46
1987	14.37	8.47	19.86
1988	32.05	4.78	26.51
1989	11.23	7.14	24.15
Standard Deviation	9.67	11.38	14.90
Coefficient of Variation (%)	104.49	112.09	111.30
Average (1980-1989)	9.26	10.15	13.39
Average (1986-1989)	13.87	2.29	15.26
Average (1987-1989)	19.22	6.80	23.50

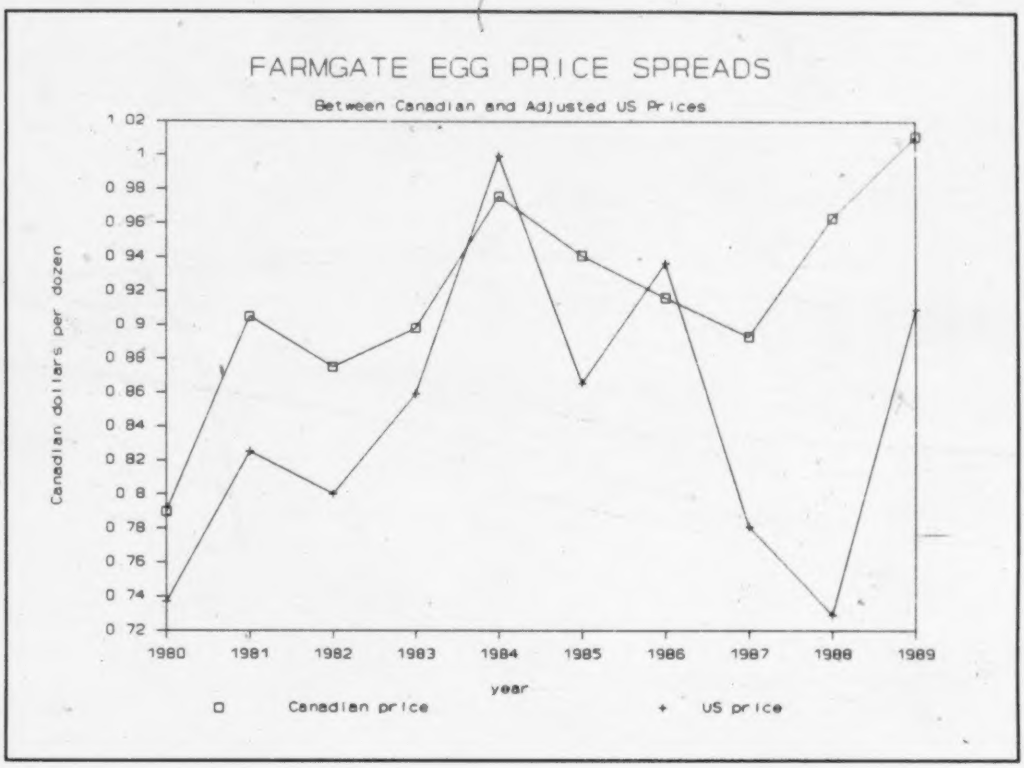

Figure IV.9 Farmgate Price Spreads Between Canadian and Adjusted US Prices for Eggs, 1980 - 1989

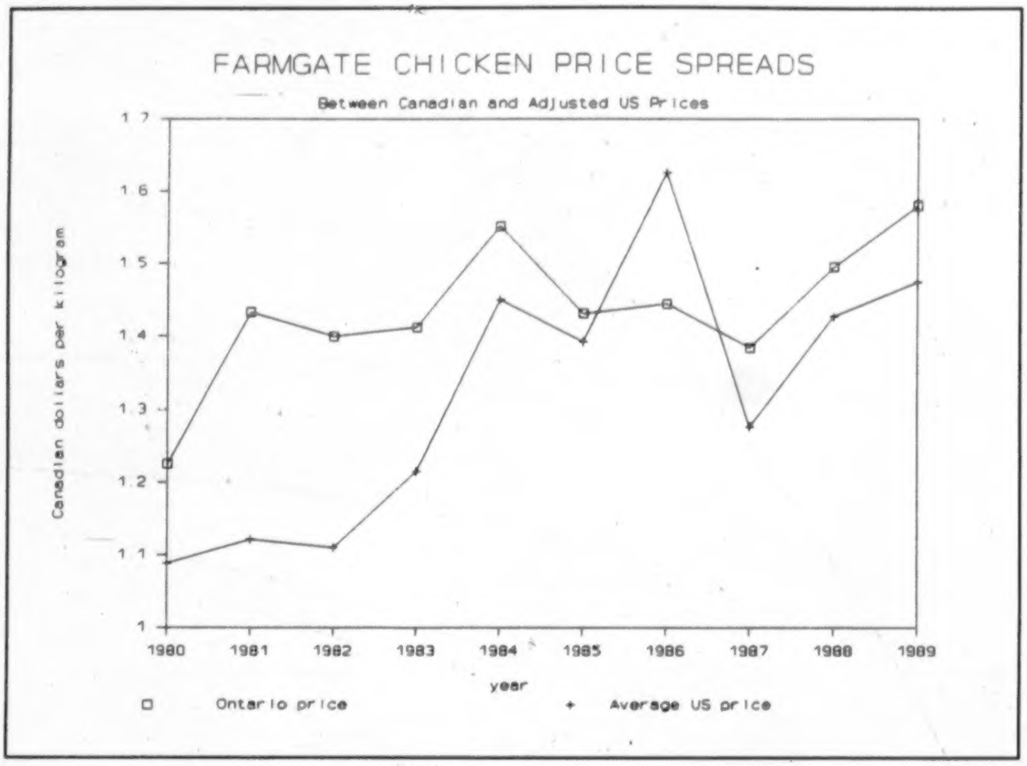

Figure IV.10 Farmgate Price Spreads Between Canadian and Adjusted US Prices for Chicken, 1980 - 1989

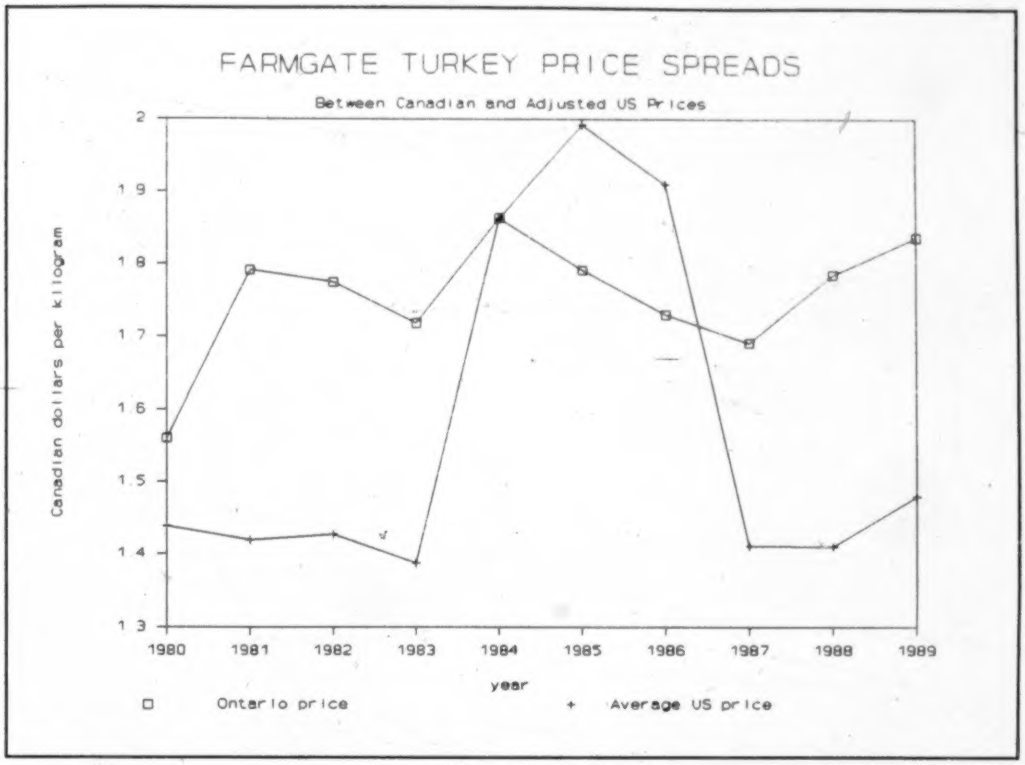

Figure IV.11 Farmgate Price Spreads Between Canadian and Adjusted US Prices for Turkey, 1980 - 1989

The following observations can be made from Table IV.4 (which provides the *ad valorem* farmgate-based NTB tariff equivalent estimates calculated in this study) and from Figures IV.9 to IV.11 (which depict the specific farmgate-based NTB tariff equivalent estimates as the spread between the Canadian price series and the transport- and tariff-adjusted US price series). Changes in the farmgate NTB tariff equivalent estimates appear to be more predominant than for the wholesale estimates. The NTB tariff equivalent estimates for eggs based on farmgate prices reveal an increasing but volatile trend over the decade. The trend for the chicken NTB tariff equivalent estimates at the farmgate level declines over the decade while the trend for turkey is relatively more constant for the early and late 1980s. Tariff equivalent estimates for turkey were affected during the 1983-1987 period by the dramatic rise and fall of US prices. As in the case of the wholesale NTB tariff equivalent estimates, the average farmgate estimates were highest for turkey, then chicken and eggs. The farmgate NTB tariff equivalent estimates appear to be considerably more volatile than those calculated at the wholesale level, given the coefficients of variation in Table IV.4 that are close to double the coefficients of variation in Table IV.2. The research question that arises from these comparisons is: *Are the wholesale-based NTB tariff equivalent estimates significantly different from the estimates calculated at the farmgate level?* If it can be assumed that there is perfect competition in the provision of marketing services, then it would be expected that there should be no difference in the estimates on a wholesale or a farmgate basis. To test the equality of the two series of estimates, a new series is calculated by subtracting the annual farmgate estimates from the wholesale estimates. The null hypothesis can then be stated as:

(1) The mean (1980-1989) of the annual differences between the NTB tariff equivalent estimates calculated using wholesale prices and the NTB tariff equivalent estimates calculated using farmgate prices is equivalent to zero.

The results of this test indicate that the farmgate NTB tariff equivalent estimates are significantly higher than the wholesale NTB tariff equivalent estimates for the period 1980-1989 at a one percent level of significance for eggs, chicken, and turkey.[40] These results suggest that there are higher implicit rates of protection at the wholesale level than at the farmgate level. One explanation of this difference is the possibility that inefficiencies at the processing and wholesaling market levels are greater than at the production level relative to the respective US market levels. Or, another possibility is that the marketing margins of the processing and wholesaling sector in Canada are higher than in the United States.

L. Variability of Tariff Equivalent Estimates

As is evident from Table IV.2, the average annual wholesale-based NTB tariff equivalent estimates calculated for eggs, chicken, and turkey fluctuate considerably from one year to the next over a ten year period. While 80 percent of the NTB tariff equivalent estimates for eggs are within plus or minus one sample standard deviation of the mean, 70 percent of the estimates for chicken fall within one standard deviation and only 60 percent for turkey.[41] Alternatively, the coefficients of variation also indicate a high degree of variability.

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[40] Results are formally reported in Appendix C.

Variation in the estimates may result from a number of factors. Domestic prices are affected by changing demand and supply conditions and by the actions of the respective national marketing agencies. The adjusted external reference prices used in the calculations are affected by demand and supply factors as well as by the exchange rate, the tariff, and by the assumed markup for transportation costs. The calculation may also be subject to variability resulting from the nature of the data. The annual averages, for example, have not been adjusted for seasonal or cyclical variability. These observations lead to the research question: *What are the sources of variability in the tariff equivalent estimates provided in Table IV.2? Specifically, are variability in the US price series, variability in the exchange rate, or variability over time factors that contribute to the volatility of the tariff equivalent estimates over the 1980-1989 period?* The following sections test for variability in the domestic price series versus the external reference price series, variability in the exchange rate, and variability over time.

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[41] The general rule of thumb is that 68 percent of the measurements are expected to fall within plus or minus one standard deviation of the mean (McClave and Dietrich 1985).

1. Domestic Price Versus External References Price Variability

Foreign price instability transmission is a concern of the Canadian egg and poultry industries, particularly of producers. It is one of the issues raised by producers prior to the creation of the national supply management programs that may resurface with the growing focus on tariffication as an approach to agricultural trade reform. Given that one of the objectives of supply management is to achieve a certain degree of price stability, a policy change that reflects a move toward tariff protection only, rather than maintaining the current tariff and import quota mix, may also require changing the objective of achieving price stability. Tariffs by their very nature, are responsive to price changes and, if not set at prohibitive levels, will transmit the market signals intrinsically linked to prices. Increased price volatility after tariffication, especially if it is attributed to import price instability, could result in pressure from producers to return to import quota protection. For this reason, it is useful to determine if US prices for eggs, chicken, and turkey have been more variable than Canadian prices in the past. Figures IV.6 to IV.11 reveal that both the Canadian and the US price series exhibit a degree of price instability over time. Moschini and Meilke (1991) suggest that large changes in their wholesale-based tariff equivalent estimates for chicken for some years depend almost exclusively on changes in Canadian prices, given fairly stable US prices. The price spreads presented in Figures IV.9 to IV.11 suggest that at the farmgate level the US prices may indeed be more variable than the Canadian prices. This issue is examined by comparing the annual percentage changes of the Canadian and US price series at the wholesale and the farmgate level for each commodity.

To test whether or not the variance of the annual percentage changes of the adjusted US price series is significantly greater than the variance of the annual percentage changes of the Canadian price series, an *F-test* is used. The null hypothesis is stated as:

(2) The variance of the US price series (1980-1989) is equivalent to the variance of the respective annual percentage changes in the Canadian price series (1980-1989).

The test results suggest that, at the wholesale level, the variance of the annual percentage changes in the US price series is not significantly different from that of the Canadian price series for any of the poultry products over the ten year period under study at a ten percent level of significance. At the farmgate level for eggs and turkey, however, the variance of the annual percentage changes in the US price series is significantly different from that of the Canadian price series over the ten year period under study at a five percent level of significance. Of course, price variability in itself does not imply that the tariff equivalent estimates will also exhibit instability. Recall that he tariff equivalent estimates are based on the spread between the Canadian and the US prices. Thus, if the two price series move together, the tariff equivalent estimate could be relatively stable.

2. Exchange Rate Variability

Another area of concern related to variability of the tariff equivalent estimates is the exchange rate. As mentioned previously, a disadvantage of the tariffication approach using the price-gap method, is its strong dependence on exchange rates. *Does the exchange rate contribute significantly to the variability of the wholesale-based NTB tariff equivalent estimates over the period 1980-1989?* This question is addressed by the null hypothesis:

(3) The mean (1980-1989) NTB tariff equivalent estimate based on wholesale prices calculated using a constant exchange rate (1980-1989 average) is equivalent to the mean (1980-1989) NTB tariff equivalent estimate using the appropriate corresponding annual exchange rate value.

This question is answered in two parts. First it is tested whether or not the 1980-1989 mean NTB tariff equivalent estimates in Table IV.2 are significantly different from the 1980-1989 mean of an alternate set of NTB tariff equivalent estimates calculated using the ten year average exchange rate (equal to 1.26) in place of the annual exchange rate. These constant NTB tariff equivalent estimates are presented in Table IV.5. To test the equality of the means of the two sets of tariff equivalent estimates with population variances unknown and not assumed to be equal, a *t-test* was used. The test results suggest that the means are not significantly different at a ten percent level of significance.

Table IV.5 Results: Constant Exchange Rate NTB Tariff Equivalent Estimates Expressed as *ad valorem* Rates for Selected Canadian Poultry Products, 1980-1989

Year	Exchange Rate $CN/$US	Eggs	Chicken	Turkey
1980	1.17	9.1	-2.4	-1.2
1981	1.20	12.9	26.9	28.8
1982	1.23	14.8	27.2	30.2
1983	1.23	10.4	27.3	23.2
1984	1.29	22.6	27.9	9.2
1985	1.37	28.6	23.4	20.1
1986	1.39	18.2	18.5	23.2
1987	1.33	33.7	35.8	52.4
1988	1.23	44.3	15.9	39.1
1989	1.18	20.6	29.6	27.0
Standard Deviation	0.08	11.19	10.53	14.76
Coefficient of Variation (%)	6.35	52.00	45.76	58.57
Average (1980-1989)	1.26	21.52	23.01	25.20
Average (1987-1989)	1.25	32.87	27.10	39.50

The second test compares the variances of the constant exchange rate and the annual exchange rate NTB tariff equivalent estimates (Table IV.2 compared to Table IV.5). The null hypothesis for this test is:

(4) The variance (1980-1989) of the NTB tariff equivalent estimate based on wholesale prices calculated using a constant exchange rate (1980-1989 average) is equivalent to the variance (1980-1989) of the NTB tariff equivalent estimate using the appropriate corresponding annual exchange rate value.

As in the case of the mean test, the results of an *F-test* to test equality of the variances suggests that the variances of the two sets of tariff equivalent estimates are not significantly different at a ten percent level of significance. It should be pointed out, however, that over the ten year period 1980-1989, the exchange rate encompasses a considerable range with the first years of the decade cancelling out the latter years.[42]

3. Variability Over Time

A third area of concern pertaining to the issue of variability in the tariff equivalent estimates relates to time. *What length of time should the tariff equivalent measure represent?* Monthly or quarterly tariff equivalent estimates would likely reflect seasonal and cyclical demand and supply conditions. This suggests that estimates representing a timeframe of less than a year are unsuitable. Given the sharp changes in the measures from one year to the next, it is apparent that the tariff equivalent estimate of any one year would not reflect an accurate level at which to bind tariff protection. This suggests that, like estimates reported in previous studies (Canada [1990]; Moschini and Meilke 1991; United States 1990), an average of the tariff equivalent estimates over a number of years may be more appropriate. Determining the length of the period may be difficult, however, since the longer the period, the less likely the measure is to reflect relevant market conditions rooted in both demand (such as consumer tastes and preferences) and supply (such as the current state of technology). The question that arises is: *What is the relevant time period to use as a base averaging period in which to calculate the NTB tariff equivalent estimates?* Assuming that the ten year period under study can serve as the historical trend, the current three year and four year averages are compared to the ten year average to see if either averages are significantly difference from the historical trend. The null hypothesis for these tests are:

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[42] In comparison to other countries, however, the Canadian-US exchange rate appears to be more stable. For example, the coefficients of variation are higher for the British-US exchange rate (12.01%) and the German-US exchange rate (20.03%) over the same time period than for the Canadian-US exchange rate (6.35%).

(5) The three year (1987-1989) average NTB tariff equivalent estimate is equivalent to the 1980-1989 average NTB tariff equivalent estimate.

(6) The four year (1986-1989) average NTB tariff equivalent estimate is equivalent to the 1980-1989 average NTB tariff equivalent estimate.

Separate *t-tests* were conducted to test if either the three year (1987-1989) mean tariff equivalent estimates or the four year (1986-1989) mean tariff equivalent estimates are significantly different from the ten year (1980-1989) mean estimates. While none of the four year means are significantly different from the ten year means for each product at a ten percent level of significance, both the three year mean estimate for eggs and the three year mean estimate for turkey are significantly different from the ten year means at a five percent level of significance. The three year mean estimate for chicken is not significantly different from the ten year mean at a ten percent level of significance. Again, this assumes that the ten year period can serve as the historical trend. The test results are specific to the particular time periods indicated, and therefore, may differ when tested against a different period.

M. Import-Preserving Tariff Equivalents

This final section examines the import-preserving tariff equivalent estimation using the model specifications identified in section G, expanding on the work of Moschini and Meilke (1991).

1. Assumptions

Table IV.6 summarizes the assumed values for the price elasticity of demand (ϵ), the price elasticity of supply (η), and a supply price coefficient (θ) which correspond to the estimate of import-preserving tariff equivalents presented in Tables IV.7 to IV.9. To provide a degree of sensitivity analysis, three cases were examined: a low tariff equivalent case, a high tariff equivalent case, and a midpoint case. The sources and the bases for the assumed values in Table IV.6 are described below.

Table IV.6 Summary of Import-Preserving Tariff Equivalent Assumptions for Eggs, Chicken, and Turkey

	Low Tariff Equivalent Case		Midpoint Case		High Tariff Equivalent Case	
	parameter	source	parameter	source	parameter	source
Eggs	ϵ=-0.07 η= 1.50 θ= 0.79	(1) (2) (3)	ϵ=-0.10 η= 1.00 θ= 0.81	(4) (5) (6)	ϵ=-0.12 η= 0.50 θ= 0.92	(7) (8) (9)
Chicken	ϵ=-0.35 η= 1.50 θ= 0.79	(1) (2) (3)	ϵ=-0.46 η= 1.00 θ= 0.89	(4) (5) (6)	ϵ=-0.56 η= 0.50 θ= 0.91	(7) (8) (9)
Turkey	ϵ=-0.36 η= 1.50 θ= 0.76	(1) (2) (3)	ϵ=-0.72 η= 1.00 θ= 0.94	(4) (5) (6)	ϵ=-1.09 η= 0.50 θ= 0.94	(7) (8) (9)

Notes:

(1) Previously estimated (Curtin, Théorêt, and Zafirion 1987).

(2) An assumed elastic response.

(3) The 1987-1989 average US-to-Canadian annual wholesale price ratio.

(4) The midpoint value between the parameter for the low tariff case and the high tariff case.

(5) An assumed unitary supply response.

(6) The quotient of the observed wholesale price less the rental value of the production quota estimated for 1986 by Bollman, Smith, and Tomiak (1988) which is discounted for 9 years by 25% over the observed wholesale price.

(7) Previously estimated (Hassan and Johnson 1976).

(8) An assumed inelastic supply response.

(9) The 1985-1989 average ratio of US wholesale costs of production (taken from USDA 1990a and converted to Canadian dollars) increased by 30% for eggs and 50% for chicken and turkey over the respective domestic wholesale prices.

Price Elasticity of Demand

Previously estimated values of the price elasticities of demand are used for the high tariff case (Hassan and Johnson 1976) and the low tariff case (Curtin, Théorêt, and Zafirion 1987). The midpoint case is taken to be the midpoint value between these two cases. These demand elasticity estimates may be slightly higher than the demand elasticities that correspond to the wholesale market level since they are derived from retail prices rather than wholesale prices.

Price Elasticity of Supply

A critical factor in determining the price elasticity of supply is the time frame in which it is considered. To solve the problem of finding previously estimated supply elasticities that relate to the same time period and to ensure consistency in the results for comparability, three types of supply responses are assumed: inelastic (high tariff case), unitary (midpoint case), and elastic (low tariff case).

Supply Price Coefficient

Three approaches are used to derive supply price coefficients. One approach assumes that Canadian poultry producers are as efficient as US poultry producers (an assumption also utilized by Moschini and Meilke (1991)). The four year (1986-1989) average adjusted US wholesale price is divided by the four year (1986-1989) average Canadian wholesale price. A second approach deducts the approximated rental value of the production quota (estimated for 1986 by Bollman, Smith, and Tomiak (1988)) discounted at a rate of 25 percent over nine years from the observed domestic wholesale price for 1986.[43] The difference is divided by the wholesale price to express the supply price coefficient as a ratio. A third method assumes that Canadian producers and processors are less efficient than producers and processors in the US egg and poultry industry based on relatively higher costs of production in Canada. Ratios are calculated by dividing the annual US wholesale costs of production (USDA 1990a), valued in Canadian dollars and increased by thirty percent for eggs and fifty percent for chicken and turkey broilers, by the annual domestic wholesale price for 1985 to 1989. These quotients are averaged over the five year period (1985-1989) to derive the supply price coefficient.

Support for the assumptions of higher costs of production can be found in recent reports of the Task Force on Competitiveness in the Agri-Food Industry (Canada, Task Force on Competitiveness in the Agri-Food Industry [TFCAFI] 1990). The task force's findings suggest that costs of production in the Canadian egg and poultry industry are higher at both the production and processing levels. Poultry and egg producers in Canada face higher input costs for chicks, commercial feed, and housing. In addition, supply management programs have been criticized for sheltering producers from market pressures that induce producers to find innovative methods to lower their costs (Canada, TFCAFI 1990, 20). Higher costs at the farmgate level are, in turn, passed on to poultry and egg processors. While processors pay significantly higher prices for poultry products, they also face higher costs for other inputs such as energy and packaging. Capital and taxes are more costly in Canada than in the United States as well. Higher costs can also be linked to the age and comparative scale of the plants, differences in productivity, and higher labour costs. For 1985 and 1986, average hourly earnings were about thirty percent higher for Canadian poultry processors than for processors in the United States (*ibid.*, 57). Given this, wholesale costs of production of eggs are assumed to be thirty percent higher in Canada than in the United States. Since poultry processing is labour-intensive and given the limitations to achieving economies of scale in Canadian markets, wholesale costs of production for chicken and turkey broilers are assumed to be fifty percent higher in Canada than in the United States.

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[43] The discount formula used is $DVQ = RVQ / (1+r)^t$ where DVQ is the discounted value of the quota, RVQ is the rental value of the quota, r is the discount rate, and t is the number of years. A fairly high discount rate has been justified in previous studies. See Moschini (1989).

2. Results

The import-preserving tariff equivalent estimates presented in Table IV.7 to Table IV.9 are *ad valorem* rates based on the percentage difference between the domestic price and the US price adjusted for transportation costs and the current tariff. These estimates are lower than Moschini and Meilke's results primarily because they reflect the nontariff barrier effects only. A more detailed comparison is provided in the next section.

Table IV.7 Results: Import-Preserving NTB Tariff Equivalent Estimates Expressed as *ad valorem* Rates for Eggs Based on Wholesale Prices, 1980-1989

Year	Low Tariff Equivalent Case	Midpoint Case	High Tariff Equivalent Case
1980	-6.3	-3.2	9.8
1981	-5.3	-2.1	10.9
1982	-6.4	-3.3	9.7
1983	-9.9	-6.8	5.6
1984	-4.5	-1.3	11.9
1985	-4.9	-1.6	11.5
1986	-14.0	-11.1	0.8
1987	1.8	5.2	19.3
1988	18.0	22.0	38.3
1989	2.4	5.9	20.0
Standard Deviation	8.79	9.10	10.31
Average (1980-1989)	-2.92	0.37	13.77
Average (1987-1989)	7.38	11.03	25.86

Table IV.8 Results: Import-Preserving NTB Tariff Equivalent Estimates Expressed as *ad valorem* Rates for Chicken Based on Wholesale Prices, 1980-1989

Year	Low Tariff Equivalent Case	Midpoint Case	High Tariff Equivalent Case
1980	-13.2	-2.7	0.8
1981	10.1	23.4	27.8
1982	7.3	20.1	24.5
1983	7.5	20.4	24.8
1984	2.9	15.2	19.4
1985	-5.9	5.4	9.2
1986	-11.2	-0.6	3.0
1987	6.6	19.4	23.7
1988	-2.0	9.8	13.8
1989	13.9	27.6	32.2
Standard Deviation	9.26	10.36	10.74
Average (1980-1989)	1.61	13.80	17.92
Average (1987-1989)	6.19	18.92	23.23

Table IV.9 Results: Import-Preserving NTB Tariff Equivalent Estimates Expressed as *ad valorem* Rates for Turkey Based on Wholesale Prices, 1980-1989

Year	Low Tariff Equivalent Case	Midpoint Case	High Tariff Equivalent Case
1980	-14.9	2.9	4.6
1981	8.2	30.8	33.0
1982	6.2	28.5	30.6
1983	0.7	21.8	23.8
1984	-15.1	2.7	4.4
1985	-11.3	7.2	8.9
1986	-10.6	8.1	9.9
1987	15.8	40.0	42.3
1988	13.8	37.6	39.9
1989	8.0	30.6	32.8
Standard Deviation	12.03	14.54	14.78
Average (1980-1989)	0.09	21.01	23.03
Average (1987-1989)	12.55	36.08	38.34

On inspection of Tables IV.7 to IV.9, an obvious problem can be identified. It is apparent that despite using reasonable assumptions for ϵ, η, and θ, negative tariff equivalent results are prevalent for a number of years. Applying Moschini and Meilke's assumed values for θ increases the number of negative values. These estimates should be treated with caution since negative values embody negative levels of NTB protection which is counterintuitive. Indeed for all of these products, it is necessary to assume that the industry is considerably inflexible and inefficient in order to derive a substantial number of positive estimates. A less conspicuous observation is the strong dependence that this model has on the supply price coefficient. The model is driven, in large part, by the value of θ. The departure from marginal cost pricing is perhaps the most difficult parameter to estimate of the three.

3. Comparisons with Previous Work

In order to facilitate comparison with the results from the Moschini and Meilke study (1991), import-preserving NTB tariff equivalent estimates for chicken are recalculated using assumptions of Moschini and the data and methodology described earlier. A cross-section of the Moschini and Meilke results along with the recalculated import-preserving NTB tariff equivalent estimates are presented in Table IV.10.

Table IV.10 Comparison of Import-Preserving Tariff Equivalent Estimates Expressed as *ad valorem* Rates Based on Wholesale Prices for Chicken, 1980-1989

Assumptions	Moschini and Meilke	This Study
$\epsilon = -0.3$ $\eta = 1.5$ $\theta = 0.67$	-0.4[a] (-12.9)[b]	4.1 (-8.4)
$\epsilon = -0.5$ $\eta = 1.0$ $\theta = 0.74$	15.4 (2.9)	17.3 (4.8)
$\epsilon = -0.7$ $\eta = 0.5$ $\theta = 0.80$	29.6 (17.1)	29.6 (17.1)

Notes:

(a). Numbers without brackets indicate the tariff equivalent estimate to both *tariff* and *nontariff* barriers.

(b). Numbers in brackets indicate the tariff equivalent estimate to nontariff barriers only.

The difference in the import-preserving tariff equivalent estimates in Table IV.10 stem from differences in the estimated value for *Pm* (Equation IV.4) and in transportation costs. Again, it is evident that for the low tariff case set of assumptions, negative values are prominent.

These observations suggest that, given the difficulties of determining accurate values for the assumptions of ϵ, η, and θ, it may be more practical to implement the tariffication process with a tariff-rate quota that preserves the level of imports rather than with a single tariff.

N. Summary

In summary, it is likely that the empirical issues surrounding tariffication will be an important consideration in determining its appropriateness as a tool in the agricultural trade reform process. With respect to the choice of market level, there are valid points which support the use of farmgate prices as opposed to wholesale prices. This is particularly the case if the products of the two pricing points are not comparable because of differences in quality or nature or, if wholesale prices are distorted by vertical integration. Under an assumption of competitive marketing margins and assuming that the tariff and transportation costs can be set at the same rate, the NTB tariff equivalent estimates are expected to be equivalent at the wholesale and farmgate levels. Statistical tests for eggs, chicken, and turkey reveal that the wholesale-based estimates are significantly higher than the farmgate-based estimates. The feature that the implicit import protection is relatively higher at the wholesale level than at the farmgate level may suggest a relatively high cost processing and wholesaling sector. Alternatively, the sector may be exerting imperfect market power against consumers. The question remains as to whether any such activities may be fostered by the supply management programs or are independent of those programs. If the former, this may constitute one factor suggesting that the calculation of protection measures be done at the wholesale level. Insofar as the implications for tariffication, higher implicit import protection at the wholesale level than at the farmgate level suggest that, for a commodity such as eggs that has the same current tariff relevant to both the farmgate and the wholesale levels, two price gap-based NTB tariff equivalent estimates exist: one that can be measured at the farmgate level and another at the wholesale level. Thus, tariffication could change the level of protection if the tariff equivalent based on wholesale prices is applied at the farmgate level, or conversely, if the farmgate-based tariff equivalent estimate is applied at the wholesale level.

The variability of the historical NTB tariff equivalent estimates is also a legitimate concern. On the one hand, converting the import quotas for poultry products to tariff equivalents may increase market responsiveness and efficiency. To some extent, variability of prices indicates pricing efficiency as producers, consumers and other participants in the marketing channel respond to the conditions of the market place. This may be desirable provided that the variability is not so large that it produces market instability. As international trade in agricultural products is liberalized globally, domestic markets are expected to become more stable. On the other hand, given the extent of the variation in the annual tariff equivalent estimates for poultry products between 1980 and 1989, it may be difficult to determine the appropriate rate to apply in place of the nontariff barriers. The tariff equivalent estimates for eggs, chicken, and turkey vary considerably over time as do the individual domestic and external reference price series. This variability can be attributed to conditions affecting both supply and demand. In terms of annual average wholesale prices, the US price series is not significantly more variable than the Canadian price series. Comparisons of annual average farmgate prices of eggs and turkey, however, indicated that the US price series are more variable than the Canadian price series. While exchange rate variability is potentially a problem in contributing to instability in the tariff equivalent measures, the exchange rate does not appear to substantially influence the variability of the tariff equivalent estimates for eggs, chicken, or turkey on average for the period 1980 to 1989. This conclusion is drawn from tests which reveal that the NTB tariff equivalent estimates calculated with a constant exchange rate (the 1980-1989 average; these estimates are provided in Table IV.5) do not differ significantly from tariff equivalent estimates calculated with the annual exchange rate. It should be noted, however, that the ten year period may not adequately reflect the impact of the exchange rate since the first half of the decade appears to cancel out the latter half. Another problem arising from the variability issue is the question of the length of time in which the tariff equivalent estimate should be averaged. Statistical tests reveal that the 1987-1989 average tariff equivalent estimates are significantly different from the ten year average estimates for eggs and turkey while the 1986-1989 average tariff equivalent estimates for eggs, chicken, and turkey are not. This indicates that the use of the current three year average, as employed by previous studies, may result in levels of protection that differ from the historical trend. While this in itself is not undesirable (since the historical trend may no longer provide a relevant benchmark), the possibility of an anomaly influencing the estimate appears to be greater the shorter the averaging period.

Lastly, as proposed by Moschini and Meilke, the import-preserving tariff equivalent measure is considered as one method to ensure that in the tariffication process imports are not squeezed out initially by a prohibitive tariff level. Import-preserving tariff equivalents illustrate the tariff equivalent measure could provide assurance to importers of continued access. The value of the import-preserving tariff equivalent measures may be difficult to determine accurately, however, since they are dependent on various factors and assumptions. In practice, the application of the tariff-rate quota as suggested in the *US Submission* may serve as a more reliable method of tariffication during the transition phase.

V. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

The nature of agricultural protection changed during the first half of the twentieth century from a system largely regulated by tariffs to one dominated by nontariff barriers. The war years impeded production and disrupted distribution and trade in agricultural markets. Confronted by the acute problems of war and economic depression, countries turned to more inward-oriented policies to revive their agricultural and industrial sectors. To address the concern over growing protectionism, the League of Nations, and later the United Nations along with the efforts of individual countries, strove to arrive at an international agreement on trade and commercial relations. The result of these efforts materialized in the formation of the *General Agreement on Tariffs and Trade*.

Article XI emerged from the initiatives of US policymakers who attempted to ban quantitative restrictions without violating existing US legislation pertaining to agriculture. Within a few years, however, Article XI was found to be inconsistent with the US Agricultural Adjustment Act. To satisfy the obligations of Section 22 of the Act, the United States requested and obtained a waiver to the provisions of Article XI from the Contracting Parties of the GATT.

Although Article XI no longer served its initial purpose, it remained in the text of the *General Agreement*. As countries developed domestic agricultural policies, Article XI became a consideration. In particular, this was the case for Canada in the development of national supply management programs for eggs and poultry. Prior to the federal legislation of the 1970s authorizing the establishment of national agricultural marketing agencies with supply management powers, provincial marketing boards had established producer marketing boards to regulate and, in some cases, to restrict the production and marketing of poultry products. When interprovincial relations deteriorated between producer marketing boards with the escalation of administrative trade barriers and destructive competition, the federal government intervened with legislation. Supply management offered a national solution while it also conformed to international obligations set out in Article XI. In some respects, Article XI has justified the existence of supply management and legitimized domestic policies which control supplies and restrict imports.

Nevertheless, supply control programs are falling into disfavour internationally. They are considered to subsidize producers and tax consumers, protect domestic markets and distort trade. Given the widespread desire to reduce agricultural protection and the growing dissatisfaction with Article XI, it appears that Canadian supply management programs are sure to fall under scrutiny, if not be required to undergo significant changes. While disagreements over export subsidies were the major stumbling block in the Uruguay Round of the trade talks, greater access to markets also held a high profile at the negotiating table. Rewriting Article XI may be one of the prerequisites for success in the negotiations on agriculture.

One approach to changing Article XI is to convert all NTBs to tariffs equivalents. Tariffication would bring Canadian imports more in line with market forces. Tariffication of nontariff barriers could be a first step toward a more nondiscriminatory, transparent, and market responsive pattern of global trade in agricultural products. Still, there are some limitations to tariffication, particularly in the areas of policy coverage and domestic policy objectives. This thesis study has raised a number of empirical issues related to tariffication concerning the choice of market level, the variability of the tariff equivalent measure, and the notion of tariff equivalent estimates that preserve the level of imports.

Briefly, it can be argued that valid reasons may exist for preferring farmgate prices over wholesale prices for use in the tariff equivalent measure, especially if the product is not homogeneous at the wholesale level or if market characteristics such as vertical integration create significant price distortions. Although foreign price instability transmission is a valid concern, based on the 1980-1989 period, US prices at the wholesale level for eggs and poultry were no more variable than Canadian prices. US farmgate prices for eggs and turkey, however, do exhibit significantly more variability than Canadian prices. Similarly, the exchange rate does not appear to have contributed to the variability of the tariff equivalent measure for eggs, chicken, or turkey over this period. While this may suggest that the exchange rate does not present a major issue, these results are limited by the testing procedure. A final aspect related to variability pertains to the length of the time period in which the tariff equivalent measure should represent. Examination of the current three and four year averaging periods reveals that for eggs and turkey they render significantly different estimates relative to the 1980-1989 period. This is not the case for chicken. Again, these test results are specific to particular time periods and may differ when tested against different time periods. Perhaps an indepth assessment of the factors influencing the measure within a particular time period would help determine the most appropriate length of time. Lastly, based on the work of Moschini and Meilke, import-preserving estimates are calculated for eggs, chicken, and turkey using three sets of assumptions related to the price elasticity of demand, the price elasticity of supply, and a supply price coefficient reflecting the departure from marginal cost pricing. Two issues arising from this methodology relate to the extent to which the model is driven by the supply price coefficient and the prevalence of negative tariff equivalent estimates.

B. Recommendations

Listed below are a number of recommendations related to tariffication of nontariff barriers in the Canadian egg and poultry industries arising from the findings presented in this study.

- The choice of price should be location-specific rather than averaged over a large geographical area, primarily because regional averages complicate the estimate required to adjust for transportation and handling costs.

- The most appropriate pricing point is one which reflects a substantial level of production as well as consumption. Ontario market prices appear to meet these criteria for the domestic price series. Some of the US price series are regional averages weighted by production. If price series for smaller areas in close proximity to Ontario are available then these series may provide a better tariff equivalent estimate.

- Given that an accurate estimation of the tariff equivalent estimates is in the best interests of all parties affected, estimates of the costs of transportation and handling should be made more readily available by the industry.

- In keeping with the guidelines of de Zeeuw (GATT 1990a), tariff equivalent estimates should be calculated using published prices. In the case of the domestic price series, the most appropriate source is Agriculture Canada while the USDA is the most appropriate source in the case of the external reference price series.

- Unless the exchange rate exhibits unusual volatility, it should be applied to the external reference price without any adjustments. These rates are published and widely available. Altering the exchange rate might jeopardize the integrity of the tariff equivalent estimates.

- The most current estimates of tariff equivalents averaged over an appropriate period of time in order to reduce the risk of anomalies would appear to be the most appropriate choice. Based on analysis of the period 1980-1989, it appears that the current three year average is sufficiently long enough to account for changes over a number of production cycles and for those related to seasonal trends. This averaging period is in keeping with previous studies.

- While the concept of import-preserving tariff equivalents is appealing, it may be impractical to introduce into the tariffication process. In an effort to estimate the expected import-preserving tariff equivalent as accurately as possible, it would be necessary to employ reasonable estimates for the price elasticities of demand and supply at the wholesale level, and more critically, the supply price coefficient. As indicated by this thesis study, a set of reasonable assumptions for these parameters can produce a broad range of tariff equivalent estimates, some of which are not useful. Specifically, tariff equivalents with negative values are non-negotiable and those with extremely low values may be unacceptable at the bargaining table. In view that the tariff equivalents are to be reduced over time, the benefit of pursuing the issue of import-preserving estimates is questionable. It may be more useful to pursue alternative measures that would provide some form of minimum access guarantees such as the tariff-rate quota.

C. Areas for Further Research

If tariffication is to be chosen as an approach to agricultural trade reform, further research elaborating the second phase of tariffication may be required. This would include examination of the rate at which the tariff equivalent should be reduced and the provision of safeguards. Import surges may be a concern to countries like Canada where regulated markets could be severely disrupted by tariff reductions coupled with falling world prices.

It is apparent that changes in the structure and competitive position of the supply-managed egg and poultry industries in Canada are to occur regardless of a resolution to Article XI or the Uruguay Round of negotiations. To this end, it may be constructive to examine the impact of a unilateral move to tariff protection only from the current tariff/import quota protection mix by implementing the first phase of tariffication. Internationally, this may prepare the Canadian poultry and egg industry for the challenges that come with agricultural trade reform in a changing global market place. Domestically, it may offer solutions to current problems related to the fairness, transparency, and efficiency of the current pricing and quota allocation systems.

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APPENDIX A

Article XI

General Elimination of Quantitative Restrictions

1. No prohibitions or restrictions other than duties, taxes or other charges, whether made effective through quotas, import or export licences or other measures, shall be instituted or maintained by any contracting party on the importation of any product of the territory of any other contracting party or on the exportation or sale for export of any product destined for the territory of any other contracting party.

2. The provisions of paragraph 1 of this Article shall not extend to the following:

(*a*) Export prohibitions or restrictions temporarily applied to prevent or relieve critical shortages of foodstuffs or other products essential to the exporting contracting party;

(*b*) Import and export prohibitions or restrictions necessary to the application of standards or regulations for the classification, grading or marketing of commodities in international trade;

(*c*) Import restrictions on any agricultural or fisheries product, imported in any form,* necessary to the enforcement of governmental measures which operate:

(i) to restrict the quantities of the like domestic product permitted to be marketed or produced, or, if there is no substantial domestic production of the like product, of a domestic product for which the imported product can be directly substituted; or

(ii) to remove a temporary surplus of the like domestic product, or, if there is no substantial domestic production of the like product, of a domestic product for which the imported product can be directly substituted, by making the surplus available to certain groups of domestic consumers free of charge or at prices below the current market level; or

(iii) to restrict the quantities permitted to be produced of any animal product the production of which is directly dependent, wholly or mainly, on the imported commodity, if the domestic production of that commodity is relatively negligible.

Any contracting party applying restrictions on the importation of any product pursuant to sub-paragraph (*c*) of this paragraph shall give public notice of the total quantity or value of the product permitted to be imported during a specified future period and of any change in such quantity or value. Moreover, any restrictions applied under (i) above shall not be such as will reduce the total of imports relative to the total of domestic production, as compared with the proportion which might reasonably be expected to rule between the two in the absence of restrictions. In determining this proportion, the contracting party shall pay due regard to the proportion prevailing during a previous representative period and to any special factors* which may have affected or may be affecting the trade in the product concerned.

ANNEX I

Ad *Article XI*

Paragraph 2(c)

The term "in any form" in this paragraph covers the same products when in an early stage of processing and still perishable, which compete directly with the fresh product and if freely imported would tend to make the restriction on the fresh product ineffective.

Paragraph 2, last sub-paragraph

The terms "special factors" includes changes in relative productive efficiency as between domestic and foreign producers, or as between different foreign producers, but not changes artificially brought about by means not permitted under the Agreement.

APPENDIX B

Wholesale Data for Eggs

			EGGS		US Price Adjustments			
YEAR	CN$/US$	US Price (NY ave) US$/doz	CN Price CN$/doz	US Price CN$/doz	6% Transport CN$/doz	US Price Plus Transport CN$/doz	Tariff CN$/doz	Plus Tariff and Transport CN$/doz
1980	1.169	0.669	1.014	0.782	0.047	0.828	0.035	0.863
1981	1.199	0.732	1.146	0.878	0.053	0.930	0.035	0.965
1982	1.234	0.701	1.117	0.865	0.052	0.917	0.035	0.952
1983	1.232	0.752	1.149	0.926	0.056	0.982	0.035	1.017
1984	1.295	0.809	1.370	1.047	0.063	1.110	0.035	1.145
1985	1.365	0.664	1.187	0.906	0.054	0.960	0.035	0.995
1986	1.389	0.711	1.166	0.988	0.059	1.047	0.035	1.082
1987	1.326	0.616	1.149	0.817	0.049	0.866	0.035	0.901
1988	1.231	0.621	1.250	0.764	0.046	0.810	0.035	0.845
1989	1.184	0.819	1.364	0.970	0.058	1.028	0.035	1.063
St. Dev	0.077	0.070	0.110	0.092	0.006	0.097	n/a	0.097
Ave (80-89)	1.263	0.709	1.191	0.894	0.054	0.948	0.035	0.983
Ave (87-89)	1.247	0.685	1.254	0.850	0.051	0.901	0.035	0.936

Farmgate Data for Eggs

			EGGS		US Price Adjustments			
YEAR	CN$/US$	US Price US$/doz	CN Price CN$/doz	US Price CN$/doz	6% Transport CN$/doz	US Price Plus Transport CN$/doz	Tariff CN$/doz	Plus Tariff and Transport CN$/doz
1980	1.169	0.5665	0.790	0.662	0.040	0.702	0.035	0.737
1981	1.199	0.6219	0.905	0.746	0.045	0.790	0.035	0.825
1982	1.234	0.5849	0.875	0.722	0.043	0.765	0.035	0.800
1983	1.232	0.6308	0.898	0.777	0.047	0.824	0.035	0.859
1984	1.295	0.7028	0.976	0.910	0.055	0.965	0.035	1.000
1985	1.365	0.5739	0.941	0.783	0.047	0.830	0.035	0.865
1986	1.389	0.6120	0.916	0.850	0.051	0.901	0.035	0.936
1987	1.326	0.5306	0.893	0.704	0.042	0.746	0.035	0.781
1988	1.231	0.5321	0.963	0.655	0.039	0.694	0.035	0.729
1989	1.184	0.6962	1.011	0.824	0.049	0.874	0.035	0.909
St. Dev	0.077	0.060	0.061	0.082	0.005	0.087	n/a	0.087
Ave (80-89)	1.263	0.605	0.917	0.763	0.046	0.809	0.035	0.844
Ave (87-89)	1.247	0.586	0.956	0.728	0.044	0.771	0.035	0.806

Supply and Disposition of Eggs

YEAR	Production ktonnes	Jan. 1 Stocks ktonnes	Imports ktonnes	Total Supply ktonnes	Exports ktonnes	Dec. 31 Stocks ktonnes	Used for Hatching ktonnes	Eggs Total Disposition ktonnes
1980	336.50	2.66	6.69	345.85	9.44	4.18	22.69	309.540
1981	337.38	4.18	5.77	347.33	10.98	4.94	22.60	308.810
1982	333.02	4.94	7.72	345.68	6.34	4.95	22.69	311.700
1983	337.77	4.95	7.24	349.96	17.77	2.70	22.39	307.100
1984	324.91	2.70	13.09	340.70	16.36	3.39	23.62	297.330
1985	321.25	3.39	13.27	337.91	18.23	2.63	24.13	292.920
1986	321.33	2.63	13.22	337.18	10.83	2.55	25.06	298.740
1987	323.51	2.55	17.03	343.09	15.85	4.72	27.60	294.920
1988	324.48	4.72	18.03	347.23	13.78	3.99	27.72	301.740
1989	324.26	3.99	17.53	345.78	14.81	5.05	28.12	297.800
St. Dev	6.87	1.01	4.77	4.24	3.91	1.02	2.33	6.72
Ave (80-89)	328.44	3.67	11.96	344.07	13.44	3.91	24.66	302.06
Ave (87-89)	324.08	3.75	17.53	345.37	14.81	4.59	27.81	298.15

Wholesale Data for Chicken ==========US Price Adjustments ==========

YEAR	CN$/US$	Eviscerated US Price US$/lb	---eviscerated----- -----CHICKEN------- CN Price CN$/kg	---eviscerated----- -----CHICKEN------- US Price CN$/kg	4% Transport CN$/kg	US Price Plus Transport CN$/kg	12.5% Tariff CN$/kg	Plus Tariff and Transport CN$/kg
1980	1.169	0.491	1.552	1.264	0.051	1.315	0.158	1.473
1981	1.199	0.487	2.002	1.286	0.051	1.337	0.161	1.498
1982	1.234	0.464	1.914	1.263	0.051	1.313	0.158	1.471
1983	1.232	0.504	2.080	1.369	0.055	1.424	0.171	1.595
1984	1.295	0.556	2.304	1.586	0.063	1.649	0.198	1.847
1985	1.365	0.508	2.034	1.530	0.061	1.591	0.191	1.782
1986	1.389	0.569	2.186	1.743	0.070	1.813	0.218	2.030
1987	1.326	0.474	2.086	1.385	0.055	1.440	0.173	1.613
1988	1.231	0.563	2.116	1.528	0.061	1.589	0.191	1.780
1989	1.184	0.590	2.478	1.540	0.062	1.602	0.193	1.794
St. Dev	0.077	0.045	0.244	0.161	0.006	0.167	0.020	0.187
Ave (80-89)	1.263	0.520	2.075	1.449	0.058	1.507	0.181	1.688
Ave (87-89)	1.247	0.542	2.227	1.484	0.059	1.544	0.186	1.729

Farmgate Data for Chicken ===========US Price Adjustments==========

YEAR	CN$/US$	Liveweight US Price US$/lb	Eviscerated US Price US$/lb	---eviscerated----- -----CHICKEN------- CN Price CN$/kg	---eviscerated----- -----CHICKEN------- US Price CN$/kg	4% Transport CN$/kg	US Price Plus Transport CN$/kg	12.5% Tariff CN$/kg	Plus Tariff and Transport CN$/kg
1980	1.169	0.279	0.363	1.226	0.935	0.037	0.972	0.117	1.089
1981	1.199	0.280	0.364	1.433	0.963	0.039	1.001	0.120	1.122
1982	1.234	0.268	0.350	1.399	0.953	0.038	0.991	0.119	1.111
1983	1.232	0.293	0.384	1.412	1.043	0.042	1.085	0.130	1.215
1984	1.295	0.332	0.436	1.552	1.244	0.050	1.294	0.156	1.450
1985	1.365	0.302	0.397	1.431	1.195	0.048	1.243	0.149	1.392
1986	1.389	0.345	0.456	1.444	1.396	0.056	1.452	0.175	1.627
1987	1.326	0.283	0.375	1.384	1.095	0.044	1.139	0.137	1.276
1988	1.231	0.340	0.451	1.495	1.225	0.049	1.274	0.153	1.427
1989	1.184	0.365	0.485	1.580	1.266	0.051	1.316	0.158	1.474
St. Dev	0.077	0.034	0.047	0.098	0.157	0.006	0.163	0.020	0.183
Ave (80-89)	1.263	0.309	0.406	1.436	1.132	0.045	1.177	0.141	1.318
Ave (87-89)	1.247	0.329	0.437	1.486	1.195	0.048	1.243	0.149	1.393

Supply and Disposition of Chicken

YEAR	Production ktonnes	Jan. 1 Stocks ktonnes	Imports ktonnes	Total Supply ktonnes	Exports ktonnes	Dec. 31 Stocks ktonnes	Total Disposition ktonnes
1980	390.20	19.84	19.90	429.94	3.05	13.04	413.85
1981	398.80	13.04	23.47	435.31	2.57	17.55	415.19
1982	397.38	17.55	26.23	441.16	1.42	14.32	425.42
1983	395.18	14.32	29.51	439.01	0.02	9.53	429.46
1984	427.40	9.53	36.08	473.01	0.46	15.18	457.37
1985	472.11	15.18	27.77	515.06	2.31	13.71	499.04
1986	487.70	13.71	30.07	531.48	0.46	11.04	519.98
1987	530.85	11.04	36.32	578.21	2.32	19.93	555.96
1988	539.84	19.93	40.59	600.36	0.81	10.85	588.70
1989	538.88	10.85	38.79	588.52	0.74	8.50	579.28
St. Dev	63.50	3.66	6.85	68.43	1.07	3.58	69.37
Ave (80-89)	457.83	14.50	30.87	503.21	1.42	13.37	488.43
Ave (87-89)	536.52	13.94	38.57	589.03	1.29	13.09	574.65

Wholesale Data for Turkey

			---eviscerated---- -----TURKEY-------		==========US Price Adjustments==========			
YEAR	CN$/US$	Eviscerated US Price US$/lb	CN Price ---- CN$/kg	US Price CN$/kg ------	3% Transport CN$/kg	US Price Plus Transport CN$/kg	12.5% Tariff CN$/kg	Plus Tariff and Transport CN$/kg
1980	1.169	0.637	2.022	1.640	0.049	1.690	0.205	1.895
1981	1.199	0.607	2.513	1.604	0.048	1.652	0.201	1.853
1982	1.234	0.608	2.543	1.653	0.050	1.703	0.207	1.909
1983	1.232	0.605	2.396	1.643	0.049	1.692	0.205	1.898
1984	1.295	0.744	2.611	2.123	0.064	2.187	0.265	2.452
1985	1.365	0.755	2.915	2.272	0.068	2.340	0.284	2.624
1986	1.389	0.722	2.859	2.210	0.066	2.277	0.276	2.553
1987	1.326	0.578	2.833	1.690	0.051	1.741	0.211	1.952
1988	1.231	0.612	2.738	1.662	0.050	1.711	0.208	1.919
1989	1.184	0.667	2.722	1.740	0.052	1.792	0.218	2.010
St. Dev	0.077	0.065	0.267	0.266	0.008	0.273	0.033	0.307
Ave (80-89)	1.263	0.653	2.615	1.824	0.055	1.879	0.228	2.107
Ave (87-89)	1.247	0.619	2.764	1.697	0.051	1.748	0.212	1.960

Farmgate Data for Turkey

				---eviscerated---- -----TURKEY-------		==========US Price Adjustments==========			
YEAR	CN$/US$	Liveweight US Price US$/lb	Eviscerated US Price US$/lb	CN Price ---- CN$/kg	US Price CN$/kg ------	3% Transport CN$/kg	US Price Plus Transport CN$/kg	12.5% Tariff CN$/kg	Plus Tariff and Transport CN$/kg
1980	1.169	0.400	0.483	1.560	1.246	0.037	1.283	0.156	1.439
1981	1.199	0.385	0.465	1.791	1.229	0.037	1.266	0.154	1.420
1982	1.234	0.375	0.454	1.775	1.236	0.037	1.273	0.154	1.427
1983	1.232	0.365	0.442	1.718	1.201	0.036	1.237	0.150	1.387
1984	1.295	0.466	0.565	1.864	1.613	0.048	1.662	0.202	1.863
1985	1.365	0.472	0.573	1.792	1.725	0.052	1.777	0.216	1.992
1986	1.389	0.444	0.540	1.729	1.654	0.050	1.703	0.207	1.910
1987	1.326	0.343	0.418	1.691	1.222	0.037	1.258	0.153	1.411
1988	1.231	0.369	0.450	1.784	1.221	0.037	1.258	0.153	1.411
1989	1.184	0.402	0.491	1.836	1.281	0.038	1.319	0.160	1.479
St. Dev	0.077	0.044	0.054	0.086	0.211	0.006	0.217	0.026	0.243
Ave (80-89)	1.263	0.402	0.488	1.754	1.363	0.041	1.404	0.170	1.574
Ave (87-89)	1.247	0.372	0.453	1.771	1.241	0.037	1.278	0.155	1.434

Supply and Disposition of Turkey

YEAR	Production ktonnes	Jan. 1 Stocks ktonnes	Imports ktonnes	Total Supply ktonnes	Exports ktonnes	Dec. 31 Stocks ktonnes	Total Disposition ktonnes
1980	100.45	18.28	1.63	120.36	0.95	16.88	102.53
1981	95.44	16.88	2.36	114.68	1.17	12.46	101.05
1982	97.51	12.46	1.93	111.90	0.71	13.44	97.75
1983	96.85	13.44	1.56	111.85	0.83	9.92	101.10
1984	97.72	9.92	1.74	109.38	1.45	8.56	99.37
1985	102.44	8.56	3.45	114.45	1.98	11.10	101.37
1986	104.91	11.10	5.25	121.26	2.88	11.15	107.23
1987	115.17	11.15	4.35	130.67	3.39	15.73	111.55
1988	118.43	15.73	2.09	136.25	4.87	14.90	116.48
1989	120.43	14.90	2.44	137.77	6.47	12.56	118.74
St. Dev	9.52	3.16	1.26	10.50	1.94	2.62	7.44
Ave (80-89)	104.94	13.24	2.68	120.86	2.47	12.67	105.72
Ave (87-89)	118.01	13.93	2.96	134.90	4.91	14.40	115.59

Appendix C

Test Results

(1) Wholesale versus farmgate prices

$$H_0: \mu^{wholesale}_{1980-1989} - \mu^{farmgate}_{1980-1989} = 0 \qquad H_1: \mu^{wholesale}_{1980-1989} - \mu^{farmgate}_{1980-1989} \neq 0$$

$$t = \frac{\bar{x} - \mu_o}{s/\sqrt{n}}$$

critical region: $t < -t\ (\alpha/2,\ n\text{-}1)$ *or* $t > t\ (\alpha/2,\ n\text{-}1)$

1%	$t\ (0.005,\ 9) = 3.250$
5%	$t\ (0.025,\ 9) = 2.262$

t stat for eggs = 8.62	Reject at a 1% level of significance.
t stat for chicken = 3.95	Reject at a 1% level of significance.
t stat for turkey = 4.43	Reject at a 1% level of significance.

(2) US versus Canadian price variability

$$H_0: \sigma^2_{US} = \sigma^2_{CN} \qquad H_1: \sigma^2_{US} > \sigma^2_{CN}$$

$$F = \frac{s^2_{US}}{s^2_{CN}}$$

critical region: $F > F\ (\alpha,\ n_{us}\text{-}1,\ n_{cn}\text{-}1)$

1%	$F\ (0.01,\ 8,\ 8) = 6.03$
5%	$F\ (0.05,\ 8,\ 8) = 3.44$
10%	$F\ (0.10,\ 8,\ 8) = 2.59$

Wholesale Prices:

F stat for eggs = 2.20	Do not reject at a 10% level of significance.
F stat for chicken = 0.82	Do not reject at a 10% level of significance.
F stat for turkey = 1.46	Do not reject at a 10% level of significance.

Farmgate Prices:

F stat for eggs = 5.01	Reject at a 5% level of significance.
F stat for chicken = 2.58	Do not reject at a 10% level of significance.
F stat for turkey = 5.75	Reject at a 5% level of significance.

(3) Exchange rate variability

$$H_0 : \mu_c = \mu_a \qquad H_1 : \mu_c \neq \mu_a$$

where "c" is the constant exchange rate tariff equivalent and "a" is the annual exchange rate tariff equivalent.

$$t = \frac{\bar{x}_c - \bar{x}_a}{\sqrt{\frac{s_c^2}{n_c} + \frac{s_a^2}{n_a}}}$$

critical region: $t < -t\ (\alpha/2,\ n\text{-}1)$ *or* $t > t\ (\alpha/2,\ n\text{-}1)$

1% $t\ (0.005,\ 20) = 2.845$
5% $t\ (0.025,\ 20) = 2.086$
10% $t\ (0.050,\ 20) = 1.725$

t stat for eggs = 0.03	Do not reject at a 10% level of significance.
t stat for chicken = 0.05	Do not reject at a 10% level of significance.
t stat for turkey = 0.04	Do not reject at a 10% level of significance.

(4) Exchange rate variability

$$H_0: \sigma_c = \sigma_a \qquad H_1: \sigma_c \neq \sigma_a$$

$$F = \frac{s_c^2}{s_a^2}$$

critical region: $F > F(\alpha, n_c - 1, n_a - 1)$

1% $F(0.01, 9, 9) = 4.03$
5% $F(0.05, 9, 9) = 3.18$
10% $F(0.10, 9, 9) = 2.44$

F stat for eggs = 1.03 Do not reject at a 10% level of significance.
F stat for chicken = 0.88 Do not reject at a 10% level of significance.
F stat for turkey = 0.96 Do not reject at a 10% level of significance.

(5) Three year time period

$$H_0: \mu_{3yr} = \mu_{10yr} \qquad H_1: \mu_{3yr} \neq \mu_{10yr}$$

where "3 yr" is the 1987-1989 average tariff equivalent, "10" is the 1980-1989 average tariff equivalent, and "p" is the pooled number of observations.

$$t = \frac{\bar{x}_c - \bar{x}_a}{\sqrt{s_p^2\left(\frac{1}{n_c} + \frac{1}{n_a}\right)}}$$

critical region: $t < -t(\alpha/2, p-2)$ *or* $t > t(\alpha/2, p-2)$

1% $t(0.005, 11) = 3.106$
5% $t(0.025, 11) = 2.201$
10% $t(0.050, 11) = 1.796$

t stat for eggs = 2.704 Reject at a 5% level of significance.
t stat for chicken = 1.140 Do not reject at a 10% level of significance.
t stat for turkey = 2.390 Reject at a 5% level of significance.

(6) Four year time period

$$H_0: \mu_{4yr} = \mu_{10yr} \qquad H_1: \mu_{4yr} \neq \mu_{10yr}$$

where "4 yr" is the 1986-1989 average tariff equivalent, "10" is the 1980-1989 average tariff equivalent, and "p" is the pooled number of observations

$$t = \frac{\bar{x}_c - \bar{x}_a}{\sqrt{s_p^2\left(\frac{1}{n_c} + \frac{1}{n_a}\right)}}$$

critical region: $t < -t\,(\alpha/2, p-2)$ *or* $t > t\,(\alpha/2, p-2)$

1% $t\,(0.005, 12) = 3.055$
5% $t\,(0.025, 12) = 2.179$
10% $t\,(0.050, 12) = 1.782$

t stat for eggs = 1.605 Do not reject at a 10% level of significance.
t stat for chicken = 0.066 Do not reject at a 10% level of significance.
t stat for turkey = 1.582 Do not reject at a 10% level of significance.